The Story of McIntyre Creek (Chasàn Chùa)

The History, Social Values, and Biodiversity of a Creek System in the Wilderness City

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Cover photo: Top left, a Northern Shoveler (photo by Steve Wilson); top right, the University pumphouse pond (photo by Maegan McCaw); bottom right, a Yellow Warbler (photo by Steve Wilson); bottom left, view of the creek from the canyon at Fish Lake Road (photo by Maegan McCaw); central photo, a seep monkey flower (photo by Maegan McCaw)

Executive Summary

McIntyre Creek is the heart of a wildlife corridor that passes through Whitehorse, Yukon (Map 1). The creek and its surrounding ecosystem hold many social, cultural, and ecological values. McIntyre Creek has a long and colorful history, beginning as a glacial meltwater channel and ending as a highly valued recreational and wilderness area that passes through the capital of the Yukon. Protection of McIntyre Creek has not been finalized, but it provides an opportunity for local conservation planning with a long-term vision.

Documenting the story of McIntyre Creek involved a thorough literature review to understand its history and ecosystems. Data and information were pooled from a variety of sources to create biodiversity maps showing different plant and animal groups or taxa. These sources of data included observations made by members of the community ("community science" data), long-term biological monitoring programs (conducted by government and other scientists and local consulting firms), conversations with experts, and our own targeted data collection using remote cameras and bat detectors.

There are many archeological sites along McIntyre Creek where artifacts have been recovered, indicating the area had been used by First Nations for at least the past 8,000 years (Ty Heffner, personal communication, Sept. 2020). Following the most recent glacial period (Section 3.1), McIntyre Creek became an important travel route for First Nations Peoples (Section 3.2). As wildlife ranges expanded south from Beringia, people followed and soon had established travel routes and campsites. The creek was originally named Chasàn Chùa, meaning Copper Creek in Southern Tutchone, due to the area's abundance of copper which was used to make tools and for trade (YGPNB, 2018). McIntyre Creek is in the Traditional Territories of the Ta'an Kwäch'än Council and the Kwanlin Dün First Nation, and the area continues to hold cultural significance for both First Nations.

Industrial activity at McIntyre Creek began in the early 1900s (Section 3.3). This included underground and open pit mines, remains of which are present to this day. The mines targeted copper and other metals often found with copper. The creek was re-named McIntyre Creek after Jack McIntyre, the first prospector to stake a claim in the area (Yukon Government, 2020a). A dumpsite near the confluence of the creek and the Yukon River wreaked havoc on the environment and displaced local First Nations (Section 3.3). More changes occurred when a hydro electric project diverted water into McIntyre Creek and altered the flow volume (Section 3.4). These activities and other developments and claims can be seen on Map 2.

The City of Whitehorse has proposed several regional parks, to be managed by the City (Section 3.5). One of these proposed parks is McIntyre Creek (Map 3). At the same time, to meet the demands of a growing population, the City has explored several subdivision expansion options. One of these proposed subdivisions extends into the McIntyre Creek corridor and has been strongly opposed by several groups. These groups have lobbied for formal protection of McIntyre Creek, including the area proposed for development, citing concerns over negative impacts to wildlife that use McIntyre Creek for year-round habitat and as a travel route to access wilderness areas to the east and west of Whitehorse. McIntyre Creek is also an important recreational area and a highly accessible place where people can connect with nature (Sections 4 and 5.7).

McIntyre Creek is an ecologically and biologically diverse area that has been classified as a Significant Wildlife Area (AEM 2000) (Section 5). The creek is surrounded by a variety of riparian and upland habitats (Section 5.2), including willow thickets, steep-walled canyons, grassy south-facing slopes, open lodgepole pine forests, mixed-wood forests, and spruce-Labrador tea forests on cool slopes. The area also has large and diverse wetlands that provide critical ecosystem services (Section 5.2.1). The vegetation found in these habitats (Section 5.2.2) contains plant communities of all successional stages and suited to different growing conditions. This vegetation diversity (Map 4) meets the habitat requirements of a variety of wildlife species with different life histories, including multiple rare and at-risk species. Invertebrates, although often overlooked as wildlife, are an important component of ecosystem function at McIntyre Creek (Section 5.3 and Map 5). Multiple species of fish and one species of amphibian are also found at the creek (Section 5.4 and Map 5). The area has become a popular birding destination among locals because of the immense diversity of bird life that the wetlands, thickets and forests attract (Section 5.5 and Map 6). Some bird species use McIntyre Creek as a stopover on their migration route, while others use the area seasonally for important life stages like reproduction. Others still can be found at McIntyre Creek year-round. The area plays a similar role for mammals (Section 5.6 and Map 7). Many small to medium sized mammals are permanent residents. For large mammals, McIntyre Creek is either part of a species' home range or serves as a movement corridor.

McIntyre Creek is the only corridor facilitating wildlife movement through the Whitehorse area. Corridors are defined as a strip of habitat that links two larger habitat patches (Brodie et al., 2015). Corridors are important for movement, genetic connectivity and maintaining population resilience (Sawaya et al., 2014; Brodie et al., 2015). In this sense, McIntyre Creek is important for providing wildlife a travel route to the large wilderness areas and associated ecological communities to the east and west of Whitehorse.

The question of whether McIntyre Creek will receive protection remains unanswered, but the creek presents several potential options for the future (Section 6). There are many interested parties and implications of protection to consider, and different groups may need to contribute to management of the area in distinct ways. Through careful planning, formal protection is likely to achieve overall positive results. McIntyre Creek provides an opportunity to practice conservation proactively, benefitting not only the local environment, but also larger landscape scale conservation planning (Section 6.2.2). This corridor through Whitehorse could be used to connect to other wilderness areas, including existing protected areas and key wildlife areas, promoting healthy human-wildlife interactions and ensuring the resilience of species' and ecosystems into the future (Map 8).

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Acronyms and Abbreviations

Acronym	Definition
CABIN	Canadian Aquatic Biomonitoring Network
CDC	Conservation Data Centre
GBIF	Global Biodiversity Information Facility
OCP	Official Community Plan
ORV	Off Road Vehicle
SARA	Species at Risk Act
WKA	Wildlife Key Area
YESAB	Yukon Environmental and Socio-economic Assessment Board

FIGURE 1. A BOREAL CHICKADEE AT MCINTYRE CREEK. PHOTO BY STEVE WILSON.

1 Introduction

McIntyre Creek is the heart of a wildlife corridor that passes through Whitehorse, Yukon. The creek and surrounding environment have adjusted to many changes over time. The area hosts numerous historic and present day cultural and social values (Sections 3 and 4). Several distinct ecological communities support an abundance of biodiversity along the creek (Section 5). Many wildlife species permanently reside at McIntyre Creek, such as coyote, red fox, Black-capped Chickadee, and Slimy Sculpin. Other species use the area as a travel route, including black bear and moose, or for part of the year or for important life stages (e.g. Yellow Warbler, Rusty Blackbird and Chinook Salmon, among others). A list of species observed at McIntyre Creek, including Latin names, is provided in Appendix A. Conserving the habitats these species rely on is critical for sustaining their long-term use of the area.

McIntyre Creek serves as a wildlife corridor for species passing through Whitehorse and is the largest continuous Significant Wildlife Area entirely within city limits (AEM, 2000). A corridor is a strip of habitat that links two larger habitat patches (Brodie et al., 2015). A Significant Wildlife Area is defined as: "*An area in a largely natural state that receives high levels of wildlife use and provides significant seasonal values to wildlife through either suitable habitat and/or providing travel corridors with adequate connectivity to the surrounding landscape*" (AEM, 2000, p. 3). Classifying McIntyre Creek as a Significant Wildlife Area means the corridor contains sensitive areas with a low tolerance to human disturbance, and hosts ecosystems that provide high value wildlife habitat (AEM, 2000).

McIntyre Creek has undergone considerable industrial activity and human alterations, but has reclaimed its wilderness character. Many local people are completely unaware of the creek's history of mining and water diversion projects (Sections 3.3 and 3.4). Over time, parts of McIntyre Creek have become popular recreational areas (Section 4), and existing developments have encroached on the creek ecosystem, creating a narrow corridor in some zones.

Protecting McIntyre Creek and designating it as a park has been a debated for many years. A proposed subdivision expansion, which would extend into the creek corridor, is at the centre of this debate. Both designation as a Regional Park (managed by the City of Whitehorse) and a Territorial Park (managed by the Yukon Government) have been proposed (Section 3.5). Those advocating for protection cite the area's value as wildlife habitat and an important corridor as grounds for designation as a park, while others have concerns about wildlife conflicts and affordable City expansion options.

Too often, conservation involves scrambling to save a species or ecosystem that has experienced losses and is under immediate threat. It is essential to take a proactive approach to conservation, rather than a reactive one, to advance more robust conservation-focussed plans that benefit multiple interested parties. This includes the "no voice" perspective, which means considering the reaction of those with no voice to the issue of discussion (Jack, 2020). In the case of McIntyre Creek, the "no-voice" could be wildlife, an ecosystem or habitat, or a future person/generation (Katarzyna Nowak, personal communication, Oct. 2020). McIntyre Creek provides an opportunity to proactively manage the landscape at broad and fine scales for long term conservation goals (Section 6.2.2).

The purpose of the project behind this report was to compile data on and document the biodiversity of McIntyre Creek. Special consideration was given to include aspects of biodiversity that are often overlooked, recognize the cultural and social values of the area, and acknowledge the Creek's contribution to local people's wellness. The project involved an extensive literature review, conversations with experts and local people, downloading existing observational data from several platforms, and collecting data through remote cameras, bat detectors, and opportunistic observations during field visits. The following sections detail the findings of this work and ends with a discussion of the different values McIntyre Creek holds and what its future could be.

2 Location

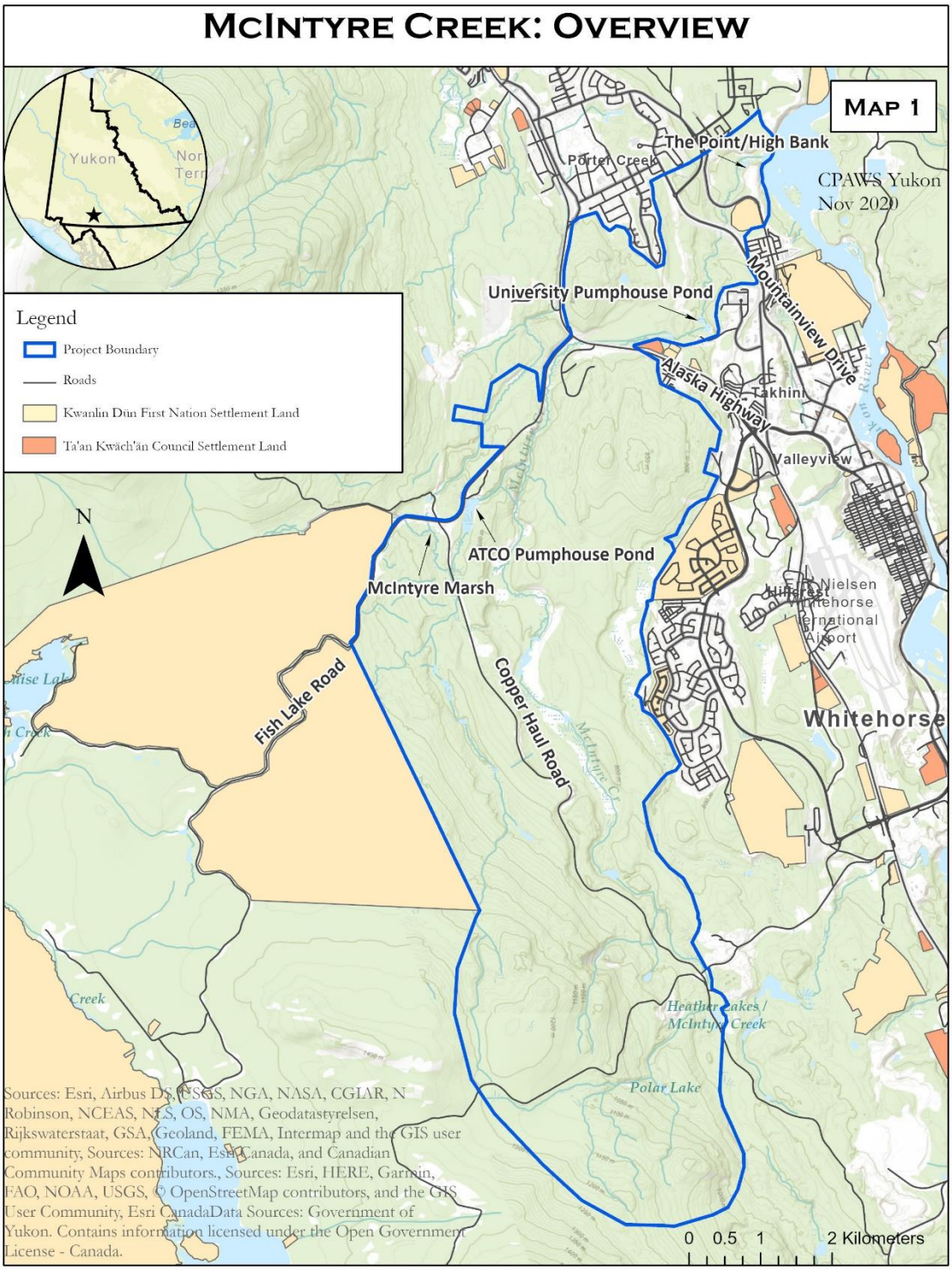
The headwaters of McIntyre Creek are located east of the urbanized centre of Whitehorse, along the alpine and subalpine slopes of Mount McIntyre (Map 1). The creek begins with groundwater seeps and a slow-flowing wetland complex. Several small stream channels eventually unite, flowing north. McIntyre creek then flows into a marsh/pond complex (McIntyre Marsh) where diverted water from another creek system (Section 3.4) enters McIntyre Creek. The creek then turns to the east, picking up speed and flowing in a defined channel through a steep-sided canyon. This portion of the creek is bordered by a paved road (Fish Lake Road), and development along the creek corridor gradually increases. The creek flows through a culvert under the Alaska Highway, entering more small wetlands and passing behind Yukon University. McIntyre Creek then flows through two more culverts to pass under Mountain View Drive and Range Road, and progresses towards the Yukon River. At its termination McIntyre Creek joins the Yukon River, which eventually drains into the Bering Sea.

Different user groups refer to two different ponds along McIntyre Creek as "pumphouse pond". For the purposes of this report, the man-made pond at the ATCO Electric pumphouse (Section 3.4) will be referred to as the ATCO pumphouse pond. The second pond, located behind Yukon University, will be referred to as the University pumphouse pond (Map 1).

In local water license applications and biological studies, McIntyre Creek has been divided into Upper, Middle, and Lower McIntyre Creek, with slightly different boundaries presented by different authors. To maintain clarity in this report, the boundaries defined by Applied Ecosystem Management Ltd. (AEM, 2000) in their Significant Wildlife Areas report will be used. Upper McIntyre Creek goes from the headwaters to McIntyre Marsh and the ATCO pumphouse pond area (Map 1); Middle McIntyre goes from the ATCO pumphouse pond area to the culvert at Mountain View Drive, and Lower McIntyre Creek goes from the culvert at Mountain View Drive to the confluence with the Yukon River (AEM, 2000).

For the purposes of exploring the history and biodiversity of McIntyre Creek in this report, a project boundary was established. This boundary encompasses the creek system and surrounding intact ecosystems, excluding developed areas and private properties where relevant. The project area inside this boundary totals 46 km^2 (approximately 2.5 times as big as the Toronto Pearson International Airport).

MAP 1 OVERVIEW OF THE MCINTYRE CREEK AREA.



3 The History of McIntyre Creek

3.1 From Ice Sheets to a Creek System

The Yukon's glacial and interglacial history has had a strong influence on its present landforms and hydrology. At the most recent glacial maximum (which was during the Late Wisconsinan McConnell glaciation) ice depth in the general Whitehorse area exceeded 1350 m above sea level (Bond, 2004). When the McConnell ice sheets retreated, they deposited glacial till and the lakes and rivers of today gradually took form (Bond, 2004). This was the beginning of McIntyre Creek, which is now a small creek system that has served many purposes – for people, wildlife, and the broader ecosystem over thousands of years.

After the ice sheets melted, the Whitehorse area began to undergo re-vegetation; first by grasses and shrubs approximately 10,000 years ago, then by trees 6,000-7,000 years ago (Kwanlin Dün First Nation, 2013). This provided new habitat for bison, elk and caribou. The ranges of these species expanded southward from Beringia, into the new grazing territory (Kwanlin Dün First Nation, 2013). First Nations hunted these species and followed them into the new range. Once the rivers cleared of glacial sediment, fish returned (about 7,000 years ago), and people eventually began to harvest fish as well (Kwanlin Dün First Nation, 2013).

3.2 Pre-Colonial History of First Nations at McIntyre Creek

McIntyre Creek played an important role in the lives of Yukon First Nations and still holds cultural significance. Features of cultural significance include traditional places, travel routes, archeological sites, and burial sites (Kwanlin Dün First Nation, 2020). The creek is located in the Traditional Territories of the Ta'an Kwäch'än Council and the Kwanlin Dün First Nation, both Southern Tutchone speaking First Nations.

Yukon First Nations established numerous fish camps near the confluence of McIntyre Creek and the Yukon River, including a camp near "The Point" or "High Bank" at the mouth of the creek, called Dàmäwtän in Southern Tutchone (JTC, 2017). Archaeological evidence at The Point shows the site was a significant look-out and hunting location (JTC, 2017). McIntyre Creek became a major travel corridor for Yukon First Nations travelling between Lake Laberge and Fish Lake, which were important areas for fishing and hunting as part of the seasonal round of subsistence activities (Kwanlin Dün First Nation, 2013; JTC, 2017). People visited Fish Lake in the fall to harvest Whitefish and hunt moose, sheep, caribou, and other small mammals (Kwanlin Dün First Nation, 2013). Fish Lake was also a good place to stay for the winter and continue fishing through the ice. In the spring, people trapped beaver and muskrat, and they often moved to creek mouths to harvest grayling and fresh plants at this time of year (Kwanlin Dün First Nation, 2013). In the summer, once mountain passes cleared, trading activities commenced with coastal traders and neighboring First Nations (Kwanlin Dün First Nation, 2013). Salmon were harvested in late summer, often resulting in large gatherings of people, who then broke off in smaller groups for winter and repeated the seasonal round (Kwanlin Dün First Nation, 2013).

There are several archaeological dig sites along McIntyre Creek where stone artifacts have been discovered (Ty Heffner, personal communication, Sept. 2020). In 2009, an inventory of the creek between the Alaska Highway and Mountain View Drive crossings resulted in the finding of approximately 18 new archaeological sites (Ty Heffner, personal communication, Sept 2nd 2020). Some of the artifacts from McIntyre Creek have

been dated to 5,000 to 7,000 years before present (Kwanlin Dün First Nation, 2013). The types of tools found along the creek indicate McIntyre Creek was used consistently for the past 8,000 years (Ty Heffner, personal communication, Sept. 2020).

Local First Nations would find copper nuggets along the upper reaches of McIntyre Creek. They used the nuggets to make arrow heads and knives (YGPNB, 2018) and for trade. Evidence of First Nation people using copper to make tools appears in the archeological record of McIntyre Creek about 1000 years ago (Ty Heffner, personal communication, Sept. 2020). Because of this availability of copper, First Nations named the creek Chasàn Chùa (Copper Creek) (YGPNB, 2018). What began as a small-scale use of the creek's natural resources would eventually turn into full-blown industrial development along McIntyre Creek.

3.3 Industrial History

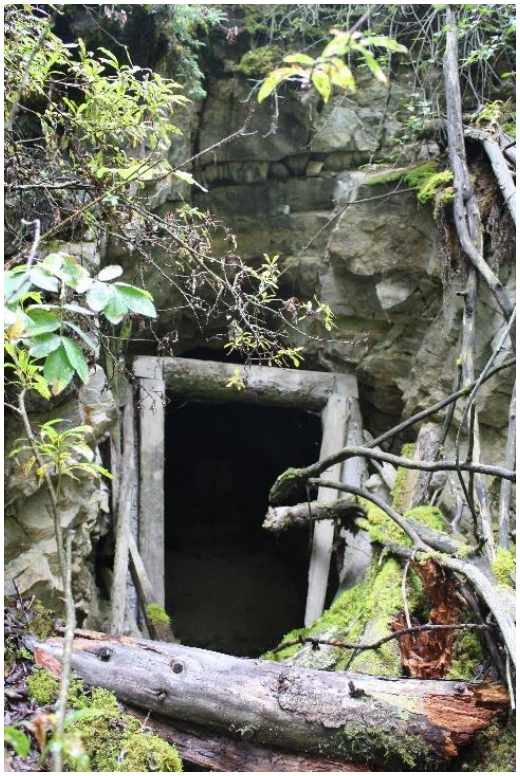


FIGURE 2. AN OLD MINE SHAFT FROM ONE OF THE HISTORIC MINES NEAR MCINTYRE CREEK. PHOTO BY MAEGAN MCCAW.

In 1898, a prospector named Jack McIntyre staked the first mining claims along the Whitehorse Copper Belt (Yukon Government, 2020a). Jack McIntyre gave his name to the nearby creek and to Mount McIntyre. The Whitehorse Copper Belt is high in copper, gold, molybdenum and silver, and is located along the western slopes of the Whitehorse valley (mindat.org, 2020). In the early 1900s the Whitehorse Copper Belt was mined by several different businesses (Green, 2019-2020; Yukon Government, 2020a), which spurred the creation of roads (e.g., the Copper Haul Road) and a railroad to service the mines (von Finster, 1997). The upper reaches of McIntyre Creek are currently crossed several times by a gravel road network that connects active gravel pits and old open pit mines that were mined into the 1970s (Green, 2019-2020). Historic mines near McIntyre Marsh and the Fish Lake road include the War Eagle, the Pueblo – which experienced a tragic cave-in, from which the bodies of six men were never recovered – the Anaconda, and the Copper King and Carlisle. Spring Creek, the Empress of India, the Grafter, Best Chance, Arctic Chief and Little Chief are all historic mines located in Upper McIntyre Creek along the Copper Haul Road, just below the headwaters (Map 2). A large portion of the lower McIntyre Creek drainage basin was also logged in the early 1900s (von Finster, 1997). Signs of these activities remain throughout the area, including old survey posts, caving-in mine shafts, open pit mines with bare rock which fail to support substantial vegetation, and piles of metal garbage scattered randomly in the forest (Green, 2019-2020). The extent to which industrial activities have impacted the creek is not known.

The U.S. and Canadian forces began using The Point at the creek's confluence with the Yukon River as a dumpsite during WWII. This displaced the First Nations that camped in the area and overlooked the

environmental impacts of the dump site (JTC, 2017). This mirrors countless incidents of clashing land uses between settlers and local First Nations, which often displaced First Nations from important hunting, fishing and camping sites that they had used for thousands of years (Kwanlin Dün First Nation, 2013; JTC, 2017) They were often forced to relocate to less productive fishing sites such as McIntyre Marsh, located 7 km (in a straight line) from the confluence (JTC, 2017).

In 1945, the dump site was closed after the U.S. Army left Whitehorse. The dump was re-opened by the City of Whitehorse as a municipal landfill in the 1950s, and in 1968 a large amount of debris from the dump slid down the west bank and into McIntyre Creek (JTC, 2017). A berm was made to re-route the creek to the north of the slide and now forms the current drainage (Von Finster, 1997; JTC, 2017). In 1975 the Yukon Water Board ordered the dump to close and all operations at The Point stopped (JTC, 2017). The current Whitehorse landfill is located just north of the McIntyre Creek drainage basin (Map 2). Many cleanup efforts have been made over the years to remove debris from The Point, but some debris still remains and low levels of contaminants have been detected in the surrounding water bodies (JTC, 2017).

FIGURE 3. TIN CANS SCATTERED IN THE FOREST NEAR MCINTYRE CREEK. PHOTO BY MAEGAN MCCAW.

3.4 Water Diversions and Fisheries

McIntyre Creek has a considerable history of water diversions stemming from the creation of a hydro energy generation system. In the 1950s water from the outflow of Fish Lake, which originally flowed into the Ibex River watershed further west of Whitehorse, was diverted into Fish Creek with a water control gate and dike to control water flowing into Fish Creek, Franklin Lake, Louise Lake, Porter Creek and then McIntyre Creek (AECOM et al., 2012). The water diverted from Porter Creek enters McIntyre Creek just upstream of McIntyre Marsh and has increased the flow volume of McIntyre Creek (von Finster, 2011a). Finally, a section of the creek just east of the Alaska Highway was straightened (AEM, 2000). Several control structures and water diversion measures are located along the waters downstream from the Fish Lake dike, including two hydro plants and a pumphouse (Map 2). This pumphouse is located at a man-made pond along McIntyre Creek, created by damming the creek channel in the 1950s and allowing the surrounding marsh to flood (AECOM et al., 2012). This hydroelectric system is now operated by ATCO Electric Yukon.

The original pumphouse at the University pumphouse pond was established by the Canadian army and was located slightly further upstream than its current position (Map 2). The new building is now a City of Whitehorse booster station that provides water to the Porter Creek reservoir to service the subdivisions of Porter Creek, Kopper King and Crestview (Stantec Consulting Ltd., 2004).

FIGURE 4. A SIGN POSTED IN FRONT OF THE BOOSTER STATION AT THE UNIVERSITY PUMPHOUSE POND. PHOTO BY MAEGAN MCCAW.

McIntyre Creek has a multi-faceted history related to fisheries. Prior to the hydrologic changes associated with hydro energy, the fish habitat of McIntyre Creek was low in productivity, though it did support spawning Chinook Salmon and several other native fish species. It wasn't until the water diversion work was completed that fisheries in McIntyre Creek experienced several changes such as overall increased fish productivity (von Finster, 2011a), fish farming, the introduction of invasive species, and a fish hatchery.

A notable local fish farming business, Icy Waters Ltd., operates along McIntyre Creek. The Arctic Char farm is located just upstream of the Fish Lake Road–Copper Haul Road intersection (Map 2) and was built on top of the main mine site of the Pueblo mine. Icy Waters began operations in 1985 (Lucas, n.d.) and sources fresh water from below the ATCO hydro plant prior to flowing into McIntyre Marsh. (Lucas, n.d.). After using this water for operations, Icy Waters processes the effluent through settling ponds before releasing it into McIntyre Marsh via the culvert under Fish Lake Road (Lucas, n.d.). Water quality and other environmental components are monitored as required under Icy Water's water license.

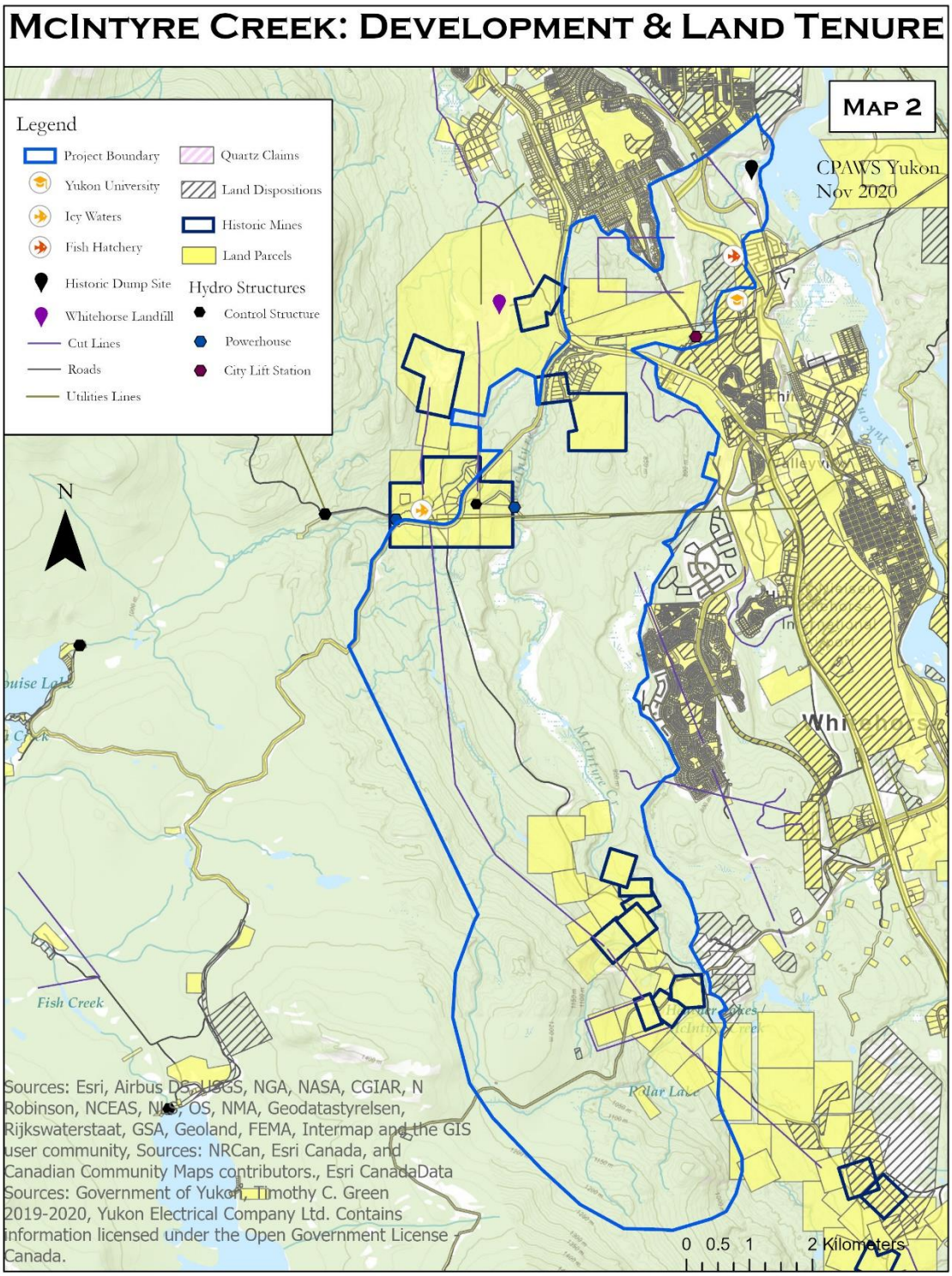
Two non-native species now reside in McIntyre Creek: Arctic Char and Rainbow Trout. Over the years some Arctic Char have occasionally escaped from Icy Waters' facility and have established a population in McIntyre Creek (Environment Yukon 2010). Rainbow Trout was purposefully released into Louise Lake in the 1950s, and now occurs from the Fish Lake control structure to the Yukon River (von Finster, 1997). Rainbow Trout is a notorious colonizer and can negatively impact native fish species as it invades their habitat (von Finster, 2011b).

A salmon hatchery operated upstream of the Mountain View Road creek crossing from 1989 to 2018 (Tanner, 1999) (Map 2). It began with an incubation box that used a warm groundwater channel as an "incubation medium" for raising Chinook Salmon (von Finster, 1997; Tanner, 1999). Groundwater temperature in this location ranges from 2°C to 6°C throughout the year (Tanner, 1999). After successful incubation, fry were tagged and then released to Flat Creek, Takhini River, Tatchun Creek and Fox Creek to supplement wild stocks

(Tanner, 1999). Over its lifespan, the incubation facility evolved from a single incubation box to a fenced, alarm-equipped enclosed area with an incubation building, rearing tanks, a sampling station, and a storage building (Trix Tanner, personal communication, Jun. 2020). The hatchery was originally operated by the Whitehorse Correctional Centre and provided educational opportunities for students and inmates. In 2002, administration of the hatchery transitioned to the Northern Research Institute (YRSEF, 2003) and in 2013 management transitioned to the Yukon College (YRSEF, 2014). The incubation facility was treated as a teaching and learning resource that involved several parties, including the Ta'an Kwäch'än First Nation, the Department of Fisheries and Oceans Canada, the Whitehorse Rapids Fish Hatchery, and College students who helped with operation of the facility (Trix Tanner, personal communication, Jun. 2020). The hatchery continued raising and releasing Chinook Salmon under the management of the Yukon College until 2018 when it was destroyed by a fire (Trix Tanner, personal communication, Jun. 2020).

FIGURE 5. THE ATCO PUMPHOUSE POND. PHOTO BY MAEGAN MCCAW.

MAP 2. DEVELOPMENT AND LAND TENURE IN THE MCINTYRE CREEK AREA.



3.5 City Growth and Park Planning

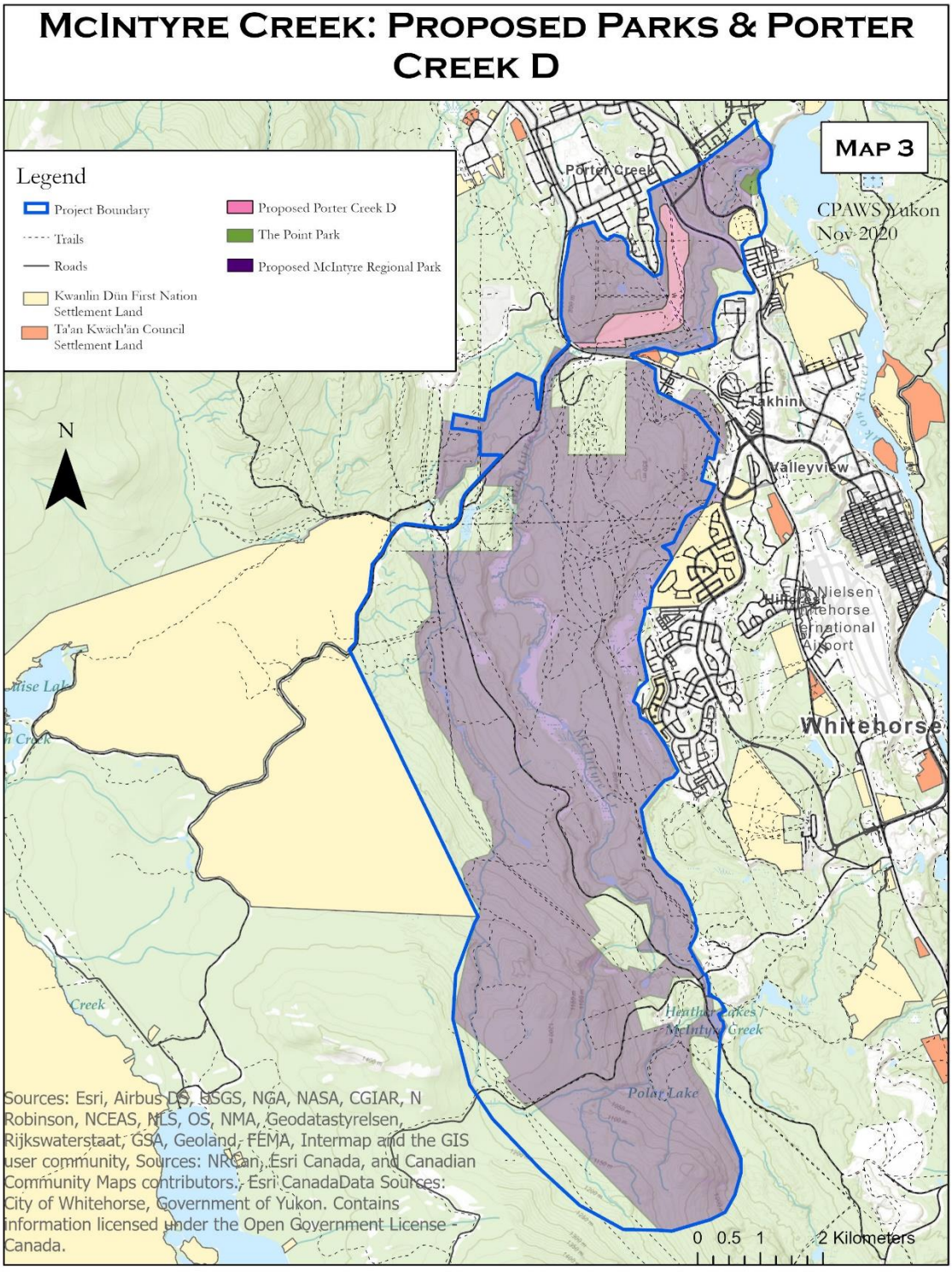
With a rapidly growing human population and increasing housing demand, the City of Whitehorse faces pressure to plan for additional residential development while maintaining its status as the "Wilderness City". The City works to incorporate concepts of sustainability into planning and development and has published several versions of the Official Community Plan (OCP) over the years. The 2010 OCP identified five potential regional parks: Chadburn Lake, Paddy's Pond/Ice Lake Park, McLean Lake Park, Wolf Creek Park, and McIntyre Creek Park. Of these, only the Chadburn Lake Park plan has been finalized.

The proposed regional park boundary for McIntyre Creek had holes in protection to accommodate proposed development plans (Map 3). The City of Whitehorse first introduced the concept of Porter Creek "D", an extension of the subdivision of Porter Creek, in the 2002 OCP. This development would connect Mountain View Drive to the Alaska Highway and would occur within the McIntyre Creek corridor (Map 3). Investigations into the suitability of developing Porter Creek "D" began in 2004 (City of Whitehorse, 2010). By the release of the 2010 OCP, development of Porter Creek "D" had still not taken place and the concept had faced opposition from several groups, the main concern being compromising the integrity, functionality and intactness of the McIntyre Creek wildlife corridor (FOMC, 2018). Development of the Raven's Ridge subdivision, which sits on top of the historic Copper King mine, was also controversial. Eighteen country residential lots were developed for phase I of the subdivision, following a Yukon Environmental and Socio-economic Assessment Board (YESAB) assessment in 2006 (Tetra Tech EBA, 2012). Phase II lots have been sold and development is underway for several lots.

Several groups have lobbied for McIntyre Creek to receive formal designation as a protected area. The Friends of McIntyre Creek group has been instrumental in these efforts. In 2018, the Friends of McIntyre Creek requested protection of McIntyre Creek at the Territorial level, including the proposed Porter Creek "D" area, in a formal proposal to City Council. According to the Friends of McIntyre Creek, permanent protection of the area is more likely if it is designated as a Territorial Park rather than a City Park, as the City could more easily reverse or alter regional protected areas to meet local demands over time (FOMC, 2018).

The Point, located along Range Road – the same historic look-out spot and camping location that First Nations used – has also been proposed as a park (Map 3). The area is culturally important to First Nations, and the old dump site received considerable cleanup and re-vegetation efforts led by the Ta'an Kwäch'än Council from 2006-2009 (TKC, 2008). Plans for Point Park have been explored, but formal designation as a park has been set aside until after a park management plan for McIntyre Creek Park has been completed (City of Whitehorse, 2020).

MAP 3. PROPOSED PARKS AND PORTER CREEK D



4 Present Conditions: Use and Long-standing Conservation Efforts

McIntyre Creek continues to be important for people. It's a popular area for people to enjoy activities like mountain biking, hiking, birding, angling, disc golf, dog-walking, skiing, rock climbing, orienteering, and exploring trails by Off Road Vehicle (ORV) (FOMC, 2018). The area with the highest level of recreational use and density of trails is within Middle McIntyre behind Yukon University. A McIntyre Creek trail user survey found 58% of users spend 75-100% of their recreational time in Middle McIntyre Creek where most of the multi-use trails are situated (FOMC et al., 2015). Educational signs have been posted along main pathways, including markers indicating the iconic Trans Canada Trail, and trail improvements have been completed such as the installation of pedestrian bridges.

FIGURE 6. A WELL-MAINTAINED BRIDGE ALONG THE TRANS CANADA TRAIL CROSSING MCINTYRE CREEK. PHOTO BY MAEGAN MCCAW.

The legacy of industrial activity along the creek continues, but in a less noticeable way. As nature gradually reclaims abandoned sites, old mine shafts may cave in and the edges of open pit mines are sloughing, posing a safety hazard to those who venture too close. Although the historic mines are inactive, there are multiple current quartz mining claims located along and often overlapping the creek in Middle and Upper McIntyre (Government of Yukon, 2020). The historic dump site also continues to negatively impact the area, with metal leaching potentially occurring near the confluence of the creek with the Yukon River (JTC, 2017). Rocks placed along the berm below the dump site are stained, evidence of sulphide oxidation of the rip rap material due to exposure to air. Copper sulphide oxides, which is toxic to aquatic organisms, may also be present in this area (JTC, 2017).

Yukon University, previously Yukon College, is located immediately adjacent to Middle McIntyre Creek and recognizes this area of McIntyre Creek as an environmentally sensitive area. McIntyre Creek is an important learning space that also contributes to research. Yukon College produced the Ayamdigut Campus Master Plan in 2015 and the first principle of this plan is to:

"Connect to the environment: Protect environmentally sensitive areas + make compelling visual, physical and programmatic connections to the natural setting" (Yukon College, 2015, p. 3).

The document goes on to recognize the importance of the natural areas of McIntyre Creek, some of which are University lands used for facilitating on-the-land learning, connection with nature and culture, and

research opportunities. Referring to the portion of McIntyre Creek that borders the campus, the 2015 campus master plan states that "*It is an integral part of a number of Yukon College programs and courses, offering unique opportunities for field experiences for students. The diversity of nearby habitats (i.e., wetlands, creek and various forest types) significantly enhances instructional opportunities.*" (Yukon College, 2015, p. 11). Now that the College has transitioned into a University, a new campus master plan is underway that will detail the University's vision for the future.

Several other groups use McIntyre Creek for various activities and programs. The Friends of McIntyre Creek, in collaboration with the Yukon Invasive Species Council, has organized garbage pick-ups and weed-pulls focused on the invasive plants Sweet Clover and Narrow-leaved Hawks Beard (Dorothy Bradley, personal communication, Aug. 2020). The Friends of McIntyre Creek have also partnered with the Yukon Conservation Society to provide hikes along the creek, and these organizations worked together to conduct a recreational users survey and brochures for self-guided hikes in Middle McIntyre Creek. Friends of McIntyre Creek continue to lead the campaign for formal protection of McIntyre Creek, including the area proposed for development for Porter Creek "D". In 2015 the Yukon Conservation Society, with support from other organizations, organized a bioblitz (a rapid inventorying of species of flora and fauna) in Middle McIntyre. The event recorded 160 species of plants and animals over a single weekend (de Jon Westman, 2015). The Yukon Fish and Game Association has conducted ecosystem restoration and educational work along McIntyre Creek, and the Klondike Snowmobile Association installed the Trans-Canada Trail bridge near the pumphouse pond in 2010 (Zimmermann, 2012). Finally, the Porter Creek Community Association, Takhini Community Association, Whistlebend Community Association, the Whitehorse Cross Country Ski Club, and the Whitehorse Disc-Golf Association, among others, have interests in the area.

McIntyre Creek continues to hold values for First Nations Peoples. Both Kwanlin Dün First Nation and Ta'an Kwäch'än Council have settlement land parcels located near the creek system. Settlement land parcels are categorized as Site Specific Lands, Rural Lands, and Community Lands (Kwanlin Dün First Nation, 2020). A series of Community Land parcels are located in Whitehorse, and several are located in the Fish Lake area. Although McIntyre Creek largely falls outside of settlement land boundaries, both First Nations have an interest in the creek system from a cultural and ecological perspective. Values relating to heritage, wildlife, and community development are associated with the creek (Kwanlin Dün First Nation, 2020). It is notable that these First Nation Governments have made efforts to restore fish populations and clean up historic waste along McIntyre Creek (Ta'an Kwäch'än Council, 2008). This interest in McIntyre Creek and the surrounding area by First Nations continues today, and any plans for the development of surrounding settlement land parcels takes the creek's natural environment into serious consideration. Further, First Nation Governments are working with the City of Whitehorse to identify appropriate areas for environmentally conscious and mutually beneficial development options. Finally, the Fish Lake region – just west of McIntyre Creek - will soon be the subject of a local area plan, developed by Kwanlin Dün First Nation and the Yukon Government, with involvement from Ta'an Kwäch'än Council (Government of Yukon and Kwanlin Dün First Nation, 2020).

The City of Whitehorse has been a key player in the installation of pedestrian bridges, park planning, and determining Significant Wildlife Areas within Whitehorse for land use planning purposes. The City is currently working on updating the OCP; as of Autumn 2020 the Whitehorse 2040 OCP is in phase 3, and the final

version may contain revised proposed regional park boundaries. The City has limited resources for the management of large parks, but if regional park planning goes ahead McIntyre Creek Park is likely to be addressed next due to the high level of public interest in the area (Mike Ellis, personal communication, Jun. 2020).

5 Biodiversity

5.1 Data Sources and Methods

This report uses multiple data sources and methods to characterize the biodiversity of McIntyre Creek. This work was not meant to be exhaustive, but was done to demonstrate the variety of species and habitats found at McIntyre Creek.

Two community science platforms, iNaturalist and eBird, were sourced for observational data of species at McIntyre Creek. iNaturalist is a joint initiative of the California Academy of Sciences and the National Geographic Society and is a community science platform for people to share biodiversity observations, learn about and inventory nature. Members upload observations of a living creature - or evidence of one, for example tracks or scat - and can either provide an identification or refer to the artificial intelligence software which matches the observation with others and suggests an identification. Other members then suggest or confirm identifications; once confirmed, observations reach 'Research Grade' status. These observations also have geographic coordinates, a photo, and a date. The Global Biodiversity Information Facility (GBIF), an online database for open access biodiversity data, maintains a dataset of Research Grade iNaturalist observations which can be filtered to meet the needs of a specific research question. eBird is a portal focused on documenting bird biodiversity worldwide and is managed by the Cornell Lab of Ornithology. The site uses bird checklist data to gather information on bird distribution, abundance, habitat use and trends. Record quality is maintained by flagging unusual observations, requiring additional information from the observer for unusual observations, and review by experts.

For this project I downloaded iNaturalist Research Grade observations and the eBird Observation Dataset from GBIF. I used the polygon area filter feature on the GBIF download page to narrow each dataset to the general Whitehorse area prior to downloading it. Observations from iNaturalist included bacteria, fungi, plants, invertebrates, fish, amphibians, birds, and mammals. The oldest observations from the Whitehorse area uploaded to iNaturalist were from 1987, though most observations have been recorded within the last few years. For bird diversity, additional observations of birds from 1961 to 2020, which

FIGURE 7. MAEGAN MCCAW CHECKING A BAT DETECTOR IN UPPER MCINTYRE CREEK. PHOTO BY JULIE THOMAS.

were downloaded from eBird, were added to a composite map.

Maps were created in ArcGIS Pro to demonstrate the characteristics of biological diversity that people encounter along McIntyre Creek and within the surrounding environment. It is interesting to note that the locations and density patterns of observations from iNaturalist and eBird indicate the areas that receive the most and least human traffic. Areas with many observations are typically more developed and easily accessible to people; areas with few or no observations are difficult to access and are typically undeveloped. This is an important caveat to remember when using observational data to demonstrate biodiversity; dense observations do not necessarily mean the area is more biodiverse, but likely indicates it is easily accessible by people (i.e., nonrandom sampling).

A thorough review of literature and reports relating to species or taxonomic surveys and habitat types along McIntyre Creek was completed. Local experts were consulted to acquire additional information about species occurrence. Observations of wildlife in the area made by locals were also included, requiring a location description and date, and with a preference for observations with a photo record.

Targeted data collection also took place. A small bat detector program was implemented with guidance from Yukon Government biologists. In addition, a small camera trapping effort took place in Middle McIntyre to supplement observations of species using the area. Organisms encountered during field visits were recorded and uploaded to iNaturalist. Eight of these observations reached Research Grade status and were included in the iNaturalist dataset downloaded from GBIF.

5.2 Habitat Diversity and Significant Wildlife Areas

McIntyre Creek is a biologically diverse area, providing vital habitat for species from many taxa (plant and animal groups) and life histories. The study by AEM (2000) that identified Significant Wildlife Areas and areas of high environmental sensitivity in Whitehorse found McIntyre Creek is composed of a network of Significant Wildlife Areas with high to moderate environmental sensitivity.

FIGURE 8. MCINTYRE CREEK FLOWS THROUGH A STEEP-SIDED CANYON AND IS BORDERED BY DIVERSE HABITAT TYPES. PHOTO BY MAEGAN MCCAW.

Varied landscapes within McIntyre Creek form a strong foundation for biodiversity across multiple scales. A series of different wetland types ranging from fens to shallow open water habitats are surrounded by terrain varying from approximately 650 m to 1000 m in elevation. Steep bluffs rise sharply above the creek in several places, sometimes more than 50 m high (AEM, 2000). The terrain along the creek supports different riparian and upland habitats such as grassy south-facing slopes, open lodgepole pine-bearberry dominated forests, or thick Spruce-Labrador tea

dominated forests. Wildfires – the most recent ones being the 1920s wildfire and another that occurred in the 1980s – have also affected the forest stands along McIntyre Creek and have contributed to assorted successional stages in the area (AEM, 2000). At a broad, landscape-level scale, these habitats make up the only corridor connecting the wilderness area west of Whitehorse to the Yukon River and mountains east of Whitehorse and play an essential role in connecting larger landscape units. At a fine scale, the area supports organism diversity. This foundation is bolstered further by the presence of species that play important ecological roles. This includes beavers, the ecosystem engineers; unique habitat features such as permanent freshwater springs; and a strong network of species interactions and relationships such as between primary cavity nesters (woodpeckers), who create cavity nests in trees, and secondary cavity nesters (e.g., several species of songbirds, owls, and ducks) who often rely on primary cavity nesters for the provision of nesting sites.

5.2.1 Wetlands

Wetlands provide a variety of important ecosystem services that enable biodiversity to thrive and support the needs of human beings. These services include, but are not limited to: the supply of water; water purification; carbon sequestration; and flood regulation (MEA, 2005). Boreal peat wetlands are also important for sequestering carbon by transforming atmospheric CO_2 into peat (through vegetation such as feather mosses), which builds up over thousands of years and contributes to global climate regulation (MEA, 2005). The mainly fen wetland complex near the headwaters of McIntyre Creek is especially important for flood regulation and local carbon sequestration. This large wetland complex features several wetland types, with some areas exhibiting a defined stream channel while others don't, providing diverse aquatic habitat (AEM, 2000).

FIGURE 9. OVERLOOKING PART OF THE WETLAND COMPLEX IN UPPER MCINTYRE CREEK. PHOTO BY LILA TAUZER.

Globally, wetlands are deteriorating and disappearing faster than any other type of ecosystem, primarily due to human activities relating to population growth and economic development (MEA, 2005). Climate change is likely to increase pressures on wetlands to provide ecosystem services, while simultaneously reducing the services provided by wetlands (MEA, 2005). Wetlands can also emit methane (CH_4), a more powerful greenhouse gas than CO_2. This is especially likely when vegetated areas are flooded or water levels fluctuate dramatically, causing the vegetation to die and release methane. Flooding due to beaver activity has occurred along McIntyre Creek, resulting in habitat diversity and scattered dead spruce trees that provide nesting habitat for cavity nesting birds. McIntyre Marsh is partly composed of a flooded spruce forest from water diversion and road construction changing the water flow regime (AEM, 2000). The University pumphouse pond is composed of a marsh and shallow open water; high water levels are usually maintained by beaver

activity. Water level fluctuations within the creek and associated wetlands are further complicated by wet and dry years, the amount of spring run-off, operation of the ATCO Electric hydro system, other upstream water users, and climate change acting at a broader scale.

Groundwater discharge is an important component of the McIntyre Creek system. Different types of groundwater discharges produce varying water quality (e.g., fresh, saline, or alkaline) and quantity, and may flow year-ground, seasonally, or only during wet years (LES and von Finster, 2012). A series of seepages are likely to occur all along the creek. Groundwater seepages feed the headwaters of McIntyre Creek from the underlying permafrost layer (AEM, 2000), and von Finster (2011b) documented two sites of groundwater discharge during fish sampling efforts in Upper McIntyre. The water from these sites was described as having been underground for an extended period, and is high in total dissolved solids (von Finster, 2011b). There are several other known seeps along the creek, but of special interest are permanent freshwater springs, a rare and valuable ecosystem that supports species richness.

FIGURE 10. A PERMANENT FRESHWATER SPRING AT MCINTYRE CREEK. NOTE THE BRIGHT YELLOW SEEP MONKEY FLOWERS TO THE LEFT. PHOTO BY KATARZYNA NOWAK.

High-quality groundwater from permanent freshwater springs is abundant along Lower McIntyre (von Finster, personal communication, Jul. 2020). One such spring is located near the pumphouse pond, in Middle McIntyre. Permanent freshwater springs do not dry up or freeze, as water usually discharges at 3-7^{o} C; therefore, they support a range of invertebrate life, plant species that are drought or frost intolerant, insectivorous birds and animals, and overwintering fish (LES and von Finster, 2012). In the Yukon, the seep monkey flower only grows in permanent freshwater springs, making it a primary indicator species for the ecosystem type (LES and von Finster, 2012). Secondary indicator species of permanent freshwater springs in southwestern Yukon include American brooklime, purple-leaved willowherb, and green-tongued liverwort (LES and von Finster, 2012). These species usually grow in permanent freshwater springs, but can also be found in other habitat types.

Sections of McIntyre Creek remain open through the winter or temporarily freeze during extreme cold weather and gradually melt from beneath. This phenomenon is likely from groundwater discharge occurring (von Finster, personal communication, Jul. 2020), which is above the freezing temperature of water and inhibits freezing of the associated section of creek. For example, McIntyre Marsh remains open through the winter and a portion of Stinky Lake, in Middle McIntyre Creek, remains open through the winter due to a permanent groundwater seep (Green, 2019-2020b).

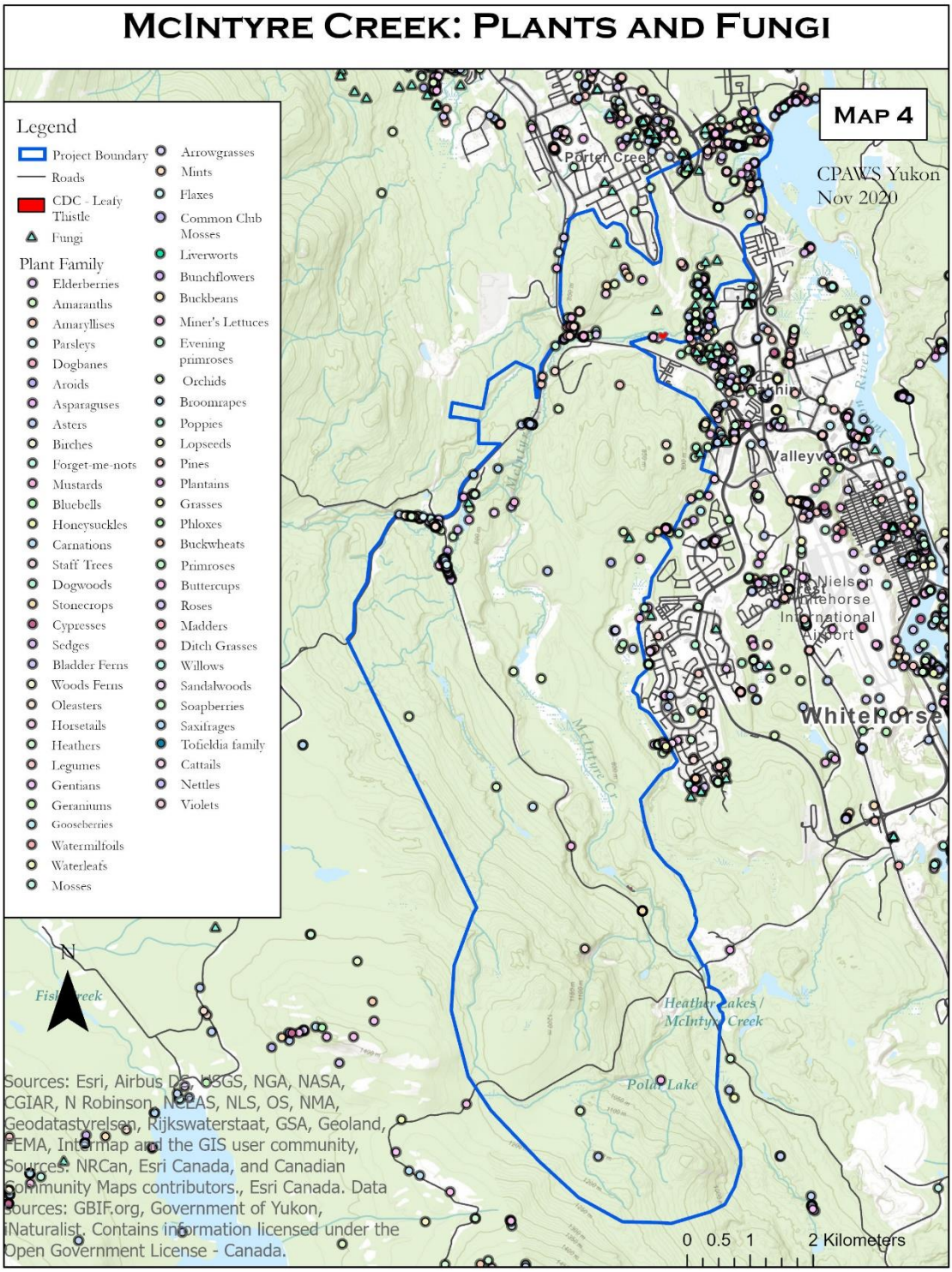
5.2.2 Vegetation

Warm slopes along McIntyre Creek support lodgepole pine, bearberry, grasses, sage, and aspen. Feathermoss, spruce, and willow are common on cool north-facing slopes (AEM, 2000). Spruce, willow, and Labrador tea dominate the old and highly structured forests, with some areas dominated by lodgepole pine (AEM, 2000). Much of Middle McIntyre Creek is on Yukon University Endowment Lands, and a large portion of the Significant Wildlife Areas in this zone are composed of mature spruce-feathermoss and spruce-willow ecosystems (AEM, 2000). Some sections in this area escaped the 1920s fire event, maintaining a presence of old growth forest. Riparian forests are highly structured, creating habitat for different forest birds (AEM, 2000). Five distinct landscape types were noted in Middle McIntyre during the 2015 bioblitz (De Jong Westman, 2015). These are: anthropogenic disturbed areas; tall shrub, closed; mixedwood forest; tall shrub, open; and coniferous forest (De Jong Westman, 2015). Each of these landscape types are composed of distinct vegetation communities (De Jong Westman, 2015).

FIGURE 11. A SPARROW'S-EGG LADY'S SLIPPER OBSERVED AT MCINTYRE CREEK. PHOTO BY MAEGAN MCCAW.

Several rare and/or at-risk plant species can be found along McIntyre Creek. The Yukon Conservation Data Centre (CDC) tracks at-risk species listed under Nature Serve, including the rare plant leafy thistle (YCDC, 2019). The species belongs to the Aster family and has the largest flowers in the Yukon. The global and Canadian Nature Serve ranks for leafy thistle are apparently secure (G4), and the Yukon rank is critically imperiled to imperiled (S1S2). Few Yukon plants are listed on the federal *Species at Risk Act* (S.C. 2002, c.29) (SARA), and none of them have been observed in McIntyre Creek. However, plants tracked by Nature Serve have been observed at McIntyre Creek. This includes leafy thistle (endangered), hookedspur violet (vulnerable), sparrow's-egg lady's slipper (vulnerable), north wind bog orchid (vulnerable), seep monkeyflower (vulnerable), red baneberry (vulnerable), broadleaf cattail (endangered), and interior lodgepole pine (vulnerable) (GBIF.org, 2020a). Plant families observed at McIntyre Creek are included in Map 4.

MAP 4 PLANTS AND FUNGI OF MCINTYRE CREEK.



5.3 Invertebrates

When people speak of 'wildlife', they often refer to iconic and charismatic mammalian megafauna. However, "wildlife" also extends to an overwhelmingly diverse but less thought of taxonomic group: invertebrates. As the most diverse and abundant animal group globally, and due to their many interactions with different trophic groups, invertebrates have a notable effect on ecosystem functioning (Prather et al., 2013). Their presence, abundance and diversity have a cascading effect on the health of the entire ecosystem. In addition, invertebrates make a significant contribution to the provision of many ecosystem services, which are likely to be affected by climate change (Prather et al., 2013). It is this abundant protein source that migratory birds rely on for successfully raising their young and that bats and young or small fish depend on. Insects also provide a vital ecosystem service by pollinating a number of plant species.

Many aquatic invertebrates can be found in the waters of McIntyre Creek, and a diverse insect assemblage is associated with the area's various terrestrial habitats (de Jon Westman, 2015; CABIN, 2020; GBIF.org, 2020a). For example, the 2015 bioblitz recorded 42 aquatic invertebrate taxa and 35 species of terrestrial insects (de Jong Westman, 2015). The composition of benthic invertebrates can indicate pollution or changes in water quality over time, and for this reason Icy Waters is required to monitor invertebrates in the creek under their water license. The Canadian Aquatic Biomonitoring Network (CABIN) has also conducted benthic invertebrate sampling in McIntyre Creek as part of a broader monitoring program. Rare insects listed under SARA observed along McIntyre Creek include the Gypsy cuckoo bumblebee (endangered) and western bumblebee (special concern) (de Jon Westman, 2015). Muskeg emerald dragonfly (vulnerable) and the Milbert's tortoiseshell butterfly (vulnerable), listed by NatureServe, have also been observed at McIntyre Creek (GBIF.org, 2020a).

FIGURE 12. A WESTERN WHITE ADMIRAL OBSERVED AT MCINTYRE CREEK. PHOTO BY KATARZYNA NOWAK.

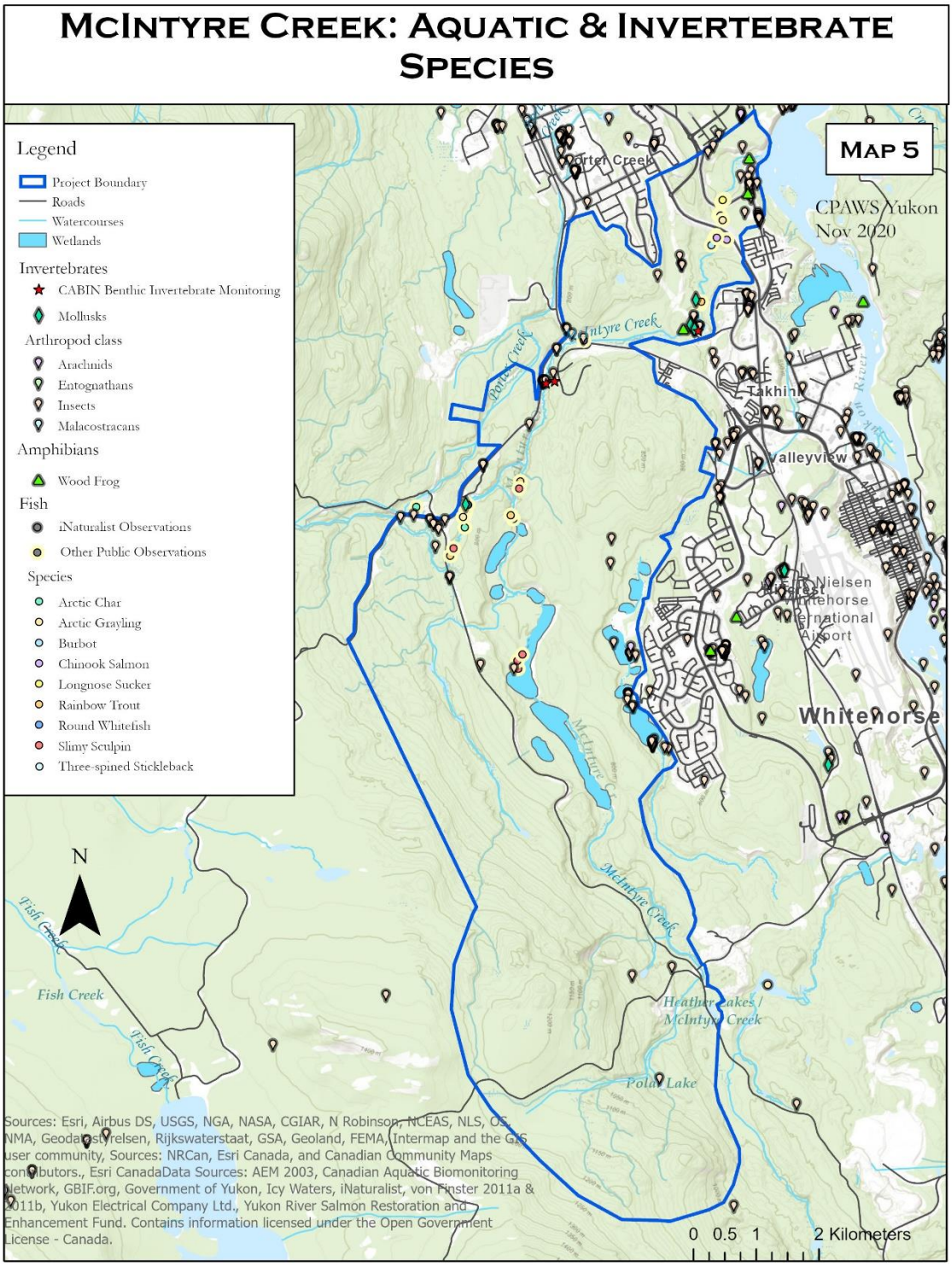
5.4 Fish and Amphibians

Several frog species can be found in the Yukon, but the most northerly-ranging and cold tolerant species is the wood frog. Wood frogs are the only amphibian whose range overlaps the McIntyre Creek area (Government of Yukon, 2019). Amphibians breathe through their skin which makes them extremely sensitive to pollution and environmental changes (Government of Yukon, 2019). The presence of wood frogs along McIntyre Creek is a positive indication of ecosystem health despite the many changes the creek has experienced over time, although long term monitoring would reveal if populations are stable, increasing or declining.

Multiple fish species live in McIntyre Creek for all or part of their life cycle (Map 5). Chinook Salmon are a culturally important species to local First Nations, and although the Yukon's Chinook Salmon population has declined considerably, they have been known to spawn in low numbers within the creek below the Alaska Highway Crossing (AEM, 2003; Trix Tanner, personal communication, Jun. 2020). Juvenile Chinook Salmon can be found in McIntyre Creek year-round (AEM, 2003). While in operation, the McIntyre Incubation Facility observed Rainbow Trout, Slimy Sculpin, Long Nose Suckers, Arctic Grayling and Burbut. Rainbow Trout and Round Whitefish were captured during a Yukon Government assessment of the ATCO pumphouse pond in 2011, and Slimy Sculpin have been found in Upper McIntyre (Trix Tanner, personal communication, Jun. 2020). Fish surveys associated with the Hydro Energy facility's most recent water license renewal also recorded the same types of species in McIntyre Creek from McIntyre Marsh to near the Yukon River.

The presence of Slimy Sculpin in Upper McIntyre demonstrates this section of the creek has adequate water quality and quantity to maintain fish populations (von Finster, 2011b). Only one fish survey of Upper McIntyre Creek is known, which was conducted by von Finster (2011) using G-type minnow traps. Slimy Sculpin were not found in the upper canyon of the creek, indicating the species has been unable to colonize that area and overwintering habitat may not be suitable. Other native species have not been recorded in Upper McIntyre Creek, which is not surprising given migratory life histories and the unclear stream channel route from the canyon of McIntyre Creek to the Upper McIntyre Creek study area (von Finster, 2011b). Rainbow trout may extend into Upper McIntyre Creek, but this remains undetermined (von Finster, 2011b).

MAP 5 AQUATIC AND INVERTEBRATE SPECIES OF MCINTYRE CREEK.



5.5 Bird Diversity

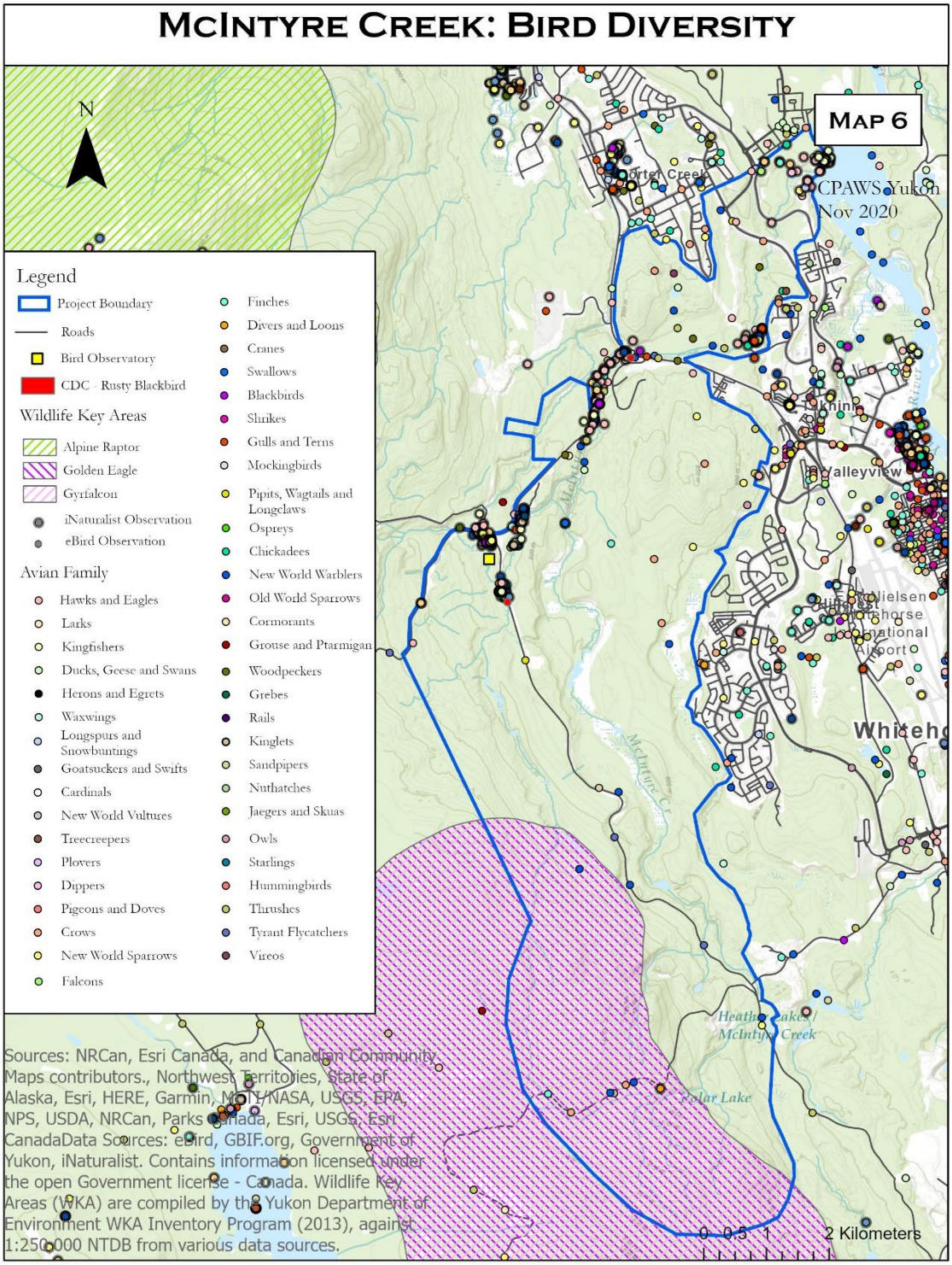
A variety of birds inhabit McIntyre Creek either as a temporary stopover on their migration route, as summer breeding habitat, or as year-round habitat. The various ecosystems along McIntyre Creek support diverse bird communities, from waterfowl, to old forest birds and dwellers of early seral successional stands, to large raptors (Map 6). The McIntyre Marsh Bird Banding Station recorded a vast array of species during the years it operated from 2009-2014. Wildlife Key Areas (WKAs) for Gyrfalcon and Golden Eagle overlap Upper McIntyre Creek, and to the north of the creek is an alpine raptor WKA (GeoYukon, 2020). In addition, due to sections of McIntyre Creek maintaining open water through the winter, waterfowl have been observed remaining at the creek year-round. For example, a considerable flock of Mallards has become resident even through the winter months (see Figure 13).

FIGURE 13. MALLARDS OVERWINTERING AT MCINTYRE MARSH. PHOTO BY STEVE WILSON.

Many rare and federally listed at-risk bird species are known to occur at McIntyre Creek. These include the Rusty Blackbird (special concern), Horned Grebe (endangered), Olive-sided Flycatcher (special concern), Red-necked Phalarope (special concern) and Short-eared Owl (special concern), species which are all protected under SARA (GBIF.org, 2020a; 2020b). Species tracked by NatureServe and observed at McIntyre Creek include the American Wigeon, Lesser Yellowlegs, Yellow-billed Loon, Brown Creeper (all vulnerable) and Lesser Scaup (endangered) (GBIF.org, 2020a; 2020b).

FIGURE 14. A RUSTY BLACKBIRD AT MCINTYRE CREEK. PHOTO BY KATARZYNA NOWAK.

MAP 6. BIRD DIVERSITY OF MCINTYRE CREEK.



5.6 Mammals

Although several bat species occur in southern Yukon, by far the most common and widespread is the little brown myotis. This species is listed as endangered under SARA, and is most likely the species that was recorded – at a high detection rate - by bat detectors at McIntyre Creek, suggesting the area is attractive to bats.

Since little work has been done on bats at McIntyre Creek, four sites were selected along the creek to set up bat detectors for four to five nights each. Bat activity is typically highest at riparian and pond/lake habitats (Slough and Jung, 2008), so sites with fairly open habitat (i.e., few-no tall trees and shrubs) near water were selected along McIntyre Creek. The bat detector sites are shown on Map 7.

All of the bat detectors placed at McIntyre Creek yielded a high number of bat detections. The highest number of bat detections were recorded at the ATCO pumphouse pond site, which totaled 5,833 bat recordings over four nights (an average of 1,458.25/night). The detectors at the other sites also collected a respectable number of recordings: at the University pumphouse pond there were 2420 bat recordings over five nights (an average of 484/night); at McIntyre Marsh there were 3025 bat recordings over five nights (an average of 605/night); and along the creek near Ravens Ridge and the Alaska Highway there were 3641 bat recordings over four nights (an average of 910.25/night). In southern Yukon bat activity typically declines at elevations above approximately 800, though they are likely still present up to approximately 1000 m (Slough and Jung 2008; Julie Thomas, personal communication, Sept. 2020). The detectors at the ATCO pumphouse pond and McIntyre Marsh were just above the 800 m threshold at 805 m and 825 m, respectively, but still garnered a high number of bat detections. At all four sites many of the detections were of feeding calls, indicating high-quality bat foraging habitat along McIntyre Creek (Julie Thomas, personal communication, Sept. 2020). The little brown myotis feeds on a variety of flying insects and is capable of catching over 1000 insects in an hour, providing the valuable service of insect pest management (Canadian Wildlife Federation, 2020).

FIGURE 15. A BAT HOUSE AND INTERPRETIVE SIGN AT MCINTYRE CREEK. PHOTO BY MAEGAN MCCAW.

Three bat houses are located along McIntyre Creek (Map 7). These bat houses don't appear to be used currently but are available if a local maternal colony is disturbed or destroyed. They may be used occasionally by transient bats (Julie Thomas, personal communication, Jul. 2020). Bats may fly up to 5 km away from their colony while foraging at night and likely roost in hollow trees, rock crevasses, or old buildings near McIntyre Creek (Julie Thomas, personal communication, Jul. 2020).

Many small mammals occur at McIntyre Creek, forming a critical part of the food chain. These include the deer mouse, least

chipmunk, Arctic ground squirrel, muskrat, North American porcupine, American marten, snowshoe hare, and one of the most commonly sighted species, the red squirrel (EDI, 2011; GBIF.org, 2020a).

McIntyre Creek is home to a variety of medium to large mammal species. Coyote, red fox, mule deer, American beaver and Canada lynx have all been recorded along the creek (EDI, 2011; GBIF.org, 2020a). River otters have also been spotted in the waters of McIntyre Creek including a family playing in the University Pumphouse Pond late one evening in August 2020 (Katarzyna Nowak, personal communication, Aug. 2020).

FIGURE 16. A BEAVER LODGE AT MCINTYRE CREEK. PHOTO BY LILA TAUZER.

The American beaver is often referred to as an ecosystem engineer because of the important role the species plays in creating open water wetlands. Beavers can create and maintain wetlands, even with fluctuations in temperature and precipitation and during periods of drought (Hood and Bayley, 2008). This species plays an important role in sustaining open water wetlands and mitigating drought in the boreal forest, especially in the face of a changing climate (Hood and Bayley, 2008). Beavers have been active throughout the McIntyre Creek system and have had a huge influence on water flow dynamics and riparian vegetation composition and structure. Old, abandoned beaver dams can be found from the headwaters to Lower McIntyre, and currently there are several active beaver dams and lodges along the creek system. Beavers have played an important role in the creation and maintenance of open water wetlands along McIntyre Creek, creating habitat for a variety of aquatic species and inhibiting the passage of others by blocking the stream channel. Due to the nature of their efforts, beavers often come in conflict with humans and sometimes experience extensive management (Hood and Bayley, 2009). In McIntyre Creek, beavers are left to function as they would naturally with intervention only occurring to protect infrastructure, such as when roadways begin to flood or culverts are blocked (Dan Shevchenko, personal communication, Jun. 2020).

The camera trapping program implemented for this project involved 3 - 5 cameras within the Middle McIntyre Creek area (Map 7) from August to October 2020. Remote cameras were used to supplement observations of mammals in the area receiving the highest level of human activity. Most remote camera recordings of wildlife occurred at night or in the early morning; this nocturnal behavior may be a strategy to avoid people (Gaynor et al., 2018). The most commonly photographed species, similar to the study conducted by EDI (2011), was coyote. The largest group of coyotes photographed together was three, although there may have been more individuals outside the frame. Red fox and North American porcupine were also photographed occasionally, as were several bird species (Common Raven, Black-capped Chickadee, Mallard Duck and a Hairy or Downy Woodpecker). An aquatic mammal was photographed one night

swimming in the University pumphouse pond, but due to poor photo quality we were unable to determine if the species was a muskrat or an otter.

FIGURE 17. A COYOTE PHOTOGRAPHED BY ONE OF THE CAMERA TRAPS IN MIDDLE MCINTYRE CREEK.

Upper McIntyre Creek is part of the home range of the Ibex wolf pack (Map 7). An ongoing collaring study by the Yukon Government shows the pack's home range extends from Alligator Lake and the Wheaton River in the south, to McIntyre Creek in the north, and to Cowley Creek in the east and the Ibex River in the west (Peter Knamiller, personal communication, Sept. 2020). Other wolf packs overlap the home range of the Ibex pack, but they haven't been collared so their home ranges remain undetermined. Wolves scavenge at the Whitehorse landfill, especially in the winter, and have occasionally been observed crossing the Alaska Highway and Fish Lake Road (Peter Knamiller, personal communication, Sept. 2020). Research Grade iNaturalist observations of wolves or wolf sign in the Whitehorse area include, among others, observations near the Whitehorse dump, behind the University, and near the headwaters of McIntyre Creek (GBIF.org 2020). In addition, a historic wolf den is located in Middle McIntyre Creek, but the den site hasn't been active for many years (Peter Knamiller, personal communication, Sept. 2020).

Caribou are known to occur along the slopes north of Whitehorse, but are rarely observed in McIntyre Creek. Public observation data provided by the Government of Yukon (2020c) revealed caribou were spotted near the Upper McIntyre area; a group of nine caribou was observed by plane on Mount McIntyre, and another observer reported a female caribou near McIntyre Village (Map 7). Mule deer may use McIntyre Creek as year-round habitat and/or as a corridor for accessing grassy slopes upstream of the Alaska Highway crossing (EDI, 2011) and are occasionally observed by the public. Deer tracks were also observed within the proposed Porter Creek "D" area during camera trapping activities

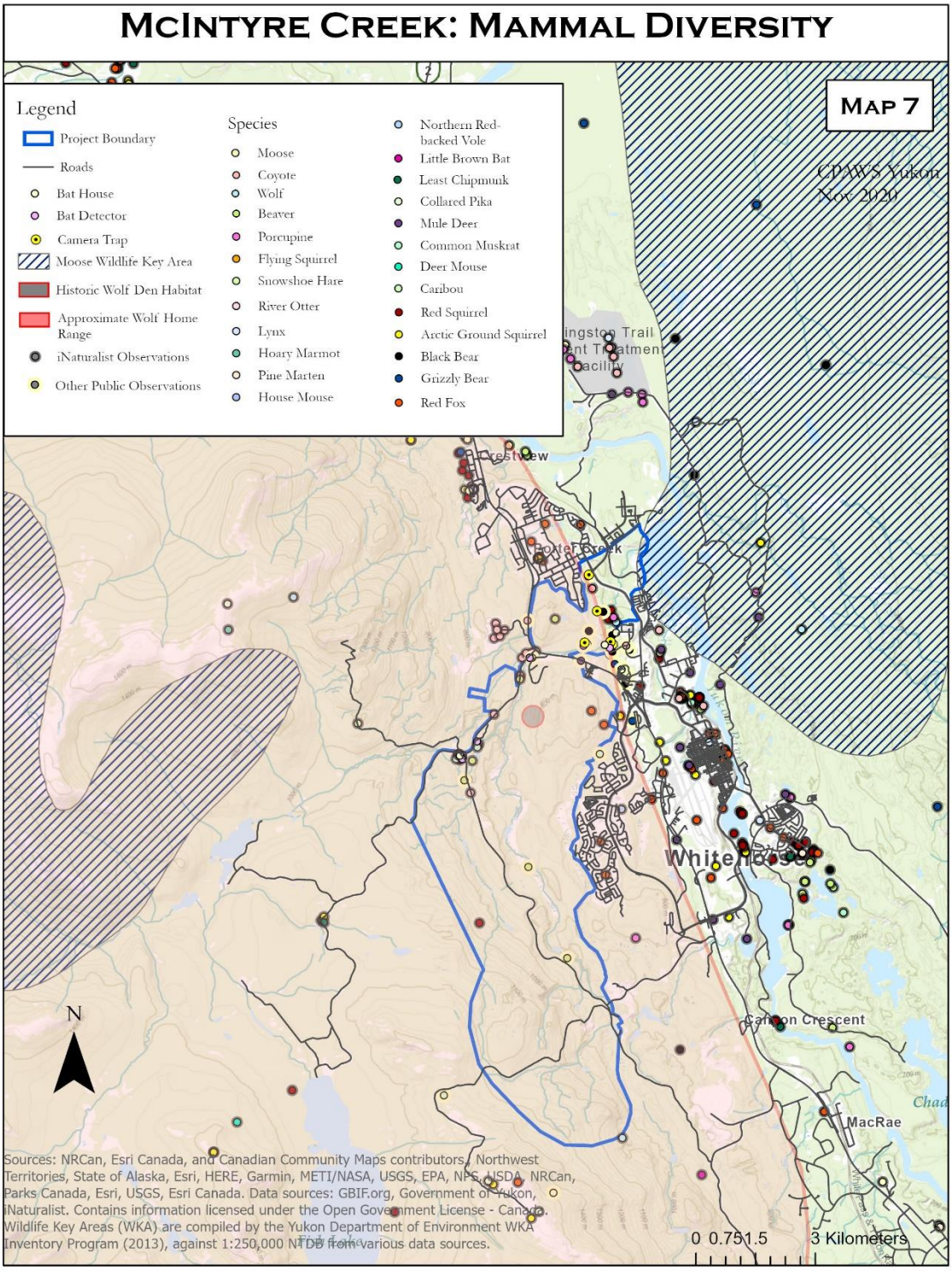
Moose, black bear and Canada lynx are large-ranging mammals that use McIntyre Creek as a corridor (EDI, 2011). Sometimes these mammals remain in the area for some time, such as a resident moose in the Stinky Lake area (FOMC et al., 2015 p 32). Moose appear to use McIntyre Creek more in the winter than in the summer, which is likely related to their tendency to select low elevation winter range (EDI, 2011). The Takhini North Community (2016-2020) has a Google Group that uses an email notification system to report wildlife sightings of concern to residents of the subdivision. Moose have occasionally been reported through this system, including a cow with a young calf near Arnhem Street and two frightened juvenile moose that were running through local residents' backyards (Takhini North Community, 2016-2020). Community members also

often report bear sightings. Black bears are spotted fairly regularly in the McIntyre Creek area and sometimes enter the surrounding developed areas. In the summer of 2020, at least two female black bears with cubs were spotted in Middle and lower McIntyre Creek, including a sow with three cubs reported to the Takhini North Community Google Group. Grizzlies are less common at McIntyre Creek, but do still use the area at times. For example, in 2018 two young grizzly bears fed on lush green grass in the old gravel pit (under remediation) between the Takhini subdivision and the University pumphouse pond (Takhini North Community 2016-2020). The bears stayed in the area for several days and most observers asked other community members to keep their distance until the bears decided to move on.

Reports of wildlife conflict at McIntyre Creek usually involve coyotes or black bears. In 2016 a coyote followed a jogger in Middle McIntyre Creek and ended up nipping her leg, breaking skin (Takhini North Community, 2016-2020). Further development and housing expansion in the area could result in more frequent human-wildlife contact and elevated conflict, especially as wildlife are accustomed to moving through the area as a corridor.

FIGURE 18. A NORTH AMERICAN PORCUPINE PHOTOGRAPHED AT NIGHT BY ONE OF THE MIDDLE MCINTYRE CREEK CAMERA TRAPS.

MAP 7. DIVERSITY OF MAMMALS IN THE MCINTYRE CREEK AREA.



5.7 Human Wellness

The biodiversity of McIntyre Creek makes an important contribution to human health and wellness. Nature is critical for the provision of ecosystem services that sustain human societies, but also plays an important role in physical and mental health and well-being (Sandifer et al., 2015; Hansen et al., 2017). Functional biodiversity, which refers to the range of roles organisms play in ecosystems and how they shape the environment, is particularly important for supporting human wellbeing (Sandifer et al., 2015). This is because humans depend on the functions and processes that ecosystems offer, such as water filtration and pollination. These effects are apparent in studies related to mental health, recovery from illness and surgery, likeliness of developing allergies, concentration, stress levels, blood pressure, and more discussed in the review by Sandifer et al. (2015). Increasing levels of biodiversity and higher degrees of exposure to nature both have a positive effect on human health, although causality is rarely determined (Sandifer et al., 2015). Interestingly, the type of "green" environment may also be a factor, with activity along riparian habitats appearing to have the greatest positive effect on mental health (Sandifer et al., 2015).

Nature's role in supporting mental health and wellbeing became especially apparent to locals during the travel restrictions and physical distancing protocols of the COVID-19 pandemic. The natural areas around Whitehorse provided a solace for residents and acted as a source of grounding during a stressful time in many people's lives. McIntyre Creek is one of the important nature refuges within Whitehorse that people actively sought out during the pandemic (Erica Heuer, personal communication, Jul. 2020). McIntyre Creek is especially valuable in this regard because it is accessible to people of all social statuses since a vehicle is not required to access the creek (Erica Heuer, personal communication, Jul. 2020).

Even outside of the pandemic, McIntyre Creek is highly valued by locals from a wellness perspective. During the McIntyre Creek trail user survey, one respondent wrote "*It is health to the soul during all seasons*" (FOMC et al., 2015 p. 29). Another respondent expressed "*McIntyre Creek has saved many a human soul. It should remain as it is to save and resave many more. It is blessed sanity in human lives gone mad*" (FOMC et al., 2015 p 30). Another user of the creek stated *"…I am delighted that this area is safe enough for a woman to enjoy comfortably in solitude. This area is very special to me, all year 'round. It adds priceless value to my life, in terms of exercise, fresh air, and nourishment for the soul*" (FOMC et al., 2015 p. 32). Other users described McIntyre Creek as an area where they seek peace, tranquility and beauty, and an important place for children to learn and get excited about nature (FOMC et al., 2015).

McIntyre Creek presents many outdoor learning opportunities for adults and kids alike. It promotes the cultivation of a strong connection with nature and an understanding of nature's intrinsic value (Erica Heuer, personal communication, Jul. 2020). Those that frequently visit McIntyre Creek learn about the passing of the seasons and phenology of the plants and wildlife that takes place right outside our back door.

6 The Future of McIntyre Creek

Despite many years of human interference and industrial activities occurring in and around the creek, McIntyre Creek has retained its value as important wildlife habitat and as a critical source for connection with nature. Local people's limited awareness of the creek's industrial history indicates a case of shifting baseline syndrome is emerging, an important phenomenon to note moving forward. Shifting baseline syndrome is social loss of memory about changing conditions in the environment, meaning perception of biological conditions shift over time (Papworth et al., 2008). What many believe to be the natural conditions along McIntyre Creek have been influenced by the history of human activities in the area, which most locals are generally unaware of.

The extent of effects from past activities along the creek are largely unknown, and while the creek has reclaimed its wild character and continues to support wildlife, the area is affected by cumulative impacts. Understanding ecological and population trends in McIntyre Creek would be beneficial for management of the area and protected area planning.

6.1 Environmental Monitoring

Long-term monitoring in the McIntyre Creek area could be supported by programs offered through Yukon University. Yukon University is one of the users which benefit from McIntyre Creek, with various classes visiting the creek for on-the-land learning opportunities. These classes include, among others, several from the environmental science and earth sciences programs for the development of field work skills. Activities students are involved in include hydrogeological research and the collection of geochemical data using two wells drilled into the aquifer under Yukon University (Mary Samolczyk, personal communication, Sept. 2020). Students also undertake stream gauging exercises, sediment sampling and analysis, and soil classification, sampling and analysis in the upland and floodplain areas of the creek (Mary Samolczyk, personal communication, Sept. 2020). Ornithology, botany and ecology classes also visit areas along McIntyre Creek for applied learning experiences. University programs could be involved in annual data collection on various physical parameters of the creek and taxa in the area to build a robust long-term monitoring dataset.

FIGURE 19. TREE SWALLOWS ON A DEAD TREE AT MCINTYRE CREEK. PHOTO BY STEVE WILSON.

Other on-the-land learning programs and interested parties not affiliated with the University could also be involved in the development of the dataset. This would expand the skillset of those involved in data collection, improve the community's connection to nature and conservation, allow for the assessment of

impacts from factors such as climate change and development, and increase collaboration between the various parties and organizations that are interested in McIntyre Creek for different reasons.

6.2 Protection

McIntyre Creek has clear values from both a human use perspective and from an ecosystem perspective. While expanding development into the McIntyre Creek Corridor is convenient in the short term, it is important to consider the long-term implications of encroaching into the only wildlife corridor that passes through the City of Whitehorse. Many groups have promoted protection of McIntyre Creek as a tool to conserve and support the biodiversity of the area. However, there are economic consequences of protection to consider as well. Waldron et al. (2020) assessed the effect of protected areas on the global economy, and found a 5:1 benefit-cost ratio for the benefits of protecting natural areas. This comprehensive calculation explored several different scenarios for protecting 30% of land and sea, and included financial returns as well as the non-financial benefits of ecosystem services (Waldron et al., 2020). The highest combined revenues and highest multi-sector benefit occurred in scenarios where protected areas are easily accessible by visitors (Waldron et al., 2020). A similar but smaller-scale comprehensive economic analysis could be done for McIntyre Creek to assist in deciding if the City or Territory should investigate formally designating it as a protected area. This assessment and analysis work could be done in partnership with Kwanlin Dün First Nation and Ta'an Kwäch'än Council in preparation for regional land use planning. Through careful planning, protecting McIntyre Creek could be economically beneficial when the area's ecosystem services are considered along with financial gains from tourism and education (Waldron et al., 2020).

FIGURE 20. A LEAST CHIPMUNK GATHERS NESTING MATERIAL. PHOTO BY STEVE WILSON.

6.2.1 People

It is critical to consider the implications of protected areas on local people. A protected area along McIntyre Creek must align with the goals of the Kwanlin Dün First Nation and Ta'an Kwäch'än Council. These goals will partly be established through the Fish Lake Local Area Plan, and the Kwanlin Dün First Nation Community Lands Plan has identified many of the goals specific to the First Nation's settlement lands and values within the Whitehorse area (Kwanlin Dün First Nation, 2020). Future management of McIntyre Creek must ensure First Nations Peoples and their interests are included. Prior to establishment of a protected area, planners would also have to consider the interests of the businesses and claims that occur along or are associated with McIntyre Creek, and navigate potential challenges. Multiple policy frameworks could be coordinated to

achieve protection that aligns with the needs of different user groups and governing bodies (Brodie et al., 2015).

The needs – and impacts – of recreation-based users of the area must be considered while planning for the future. McIntyre Creek has become a valuable area for recreation, but recreational activity along the creek has increased over the years and is leaving a noticeable impact, including increased noise disturbance. Users have noted dog feces along the trails, garbage left behind, a growing and somewhat random trail network that crisscrosses the area, and increased erosion and noise from increased traffic and ORV use (FOMC et al., 2015). One user reported "*I have noticed that the area is used more and more. The wear and tear of more traffic – both by foot, bike and motorized vehicle traffic is more obvious each year*" (FOMC et al., 2015, p 33). Further, the high volume of human presence in some areas has an undeniable impact on wildlife species that are sensitive to disturbance. Recreational activity in Middle McIntyre in summer typically begins at 6:00 am and peaks at 8:00 pm (EDI, 2011). This leaves a short amount of time in the late evening and early morning for disturbance-sensitive species to use Middle McIntyre without a high chance of encountering people. Special focus should be given to managing recreational activity in a way that avoids disturbance of riparian habitats and bird nesting areas (EDI, 2011). A paved road facilitating increased vehicle traffic in Middle McIntyre Creek would add to these existing cumulative environmental effects.

FIGURE 21. A CANADA LYNX PHOTOGRAPHED BY A CAMERA TRAP IN MIDDLE MCINTYRE CREEK.

6.2.1.1 Human-Wildlife Conflicts

To maintain McIntyre Creek as a functional corridor, human-wildlife conflicts need to be addressed. The report by Environmental Dynamics Inc. (EDI, 2011) outlined concerns about managing McIntyre Creek as a wildlife corridor, which facilitates the movement of large mammals through an area with a high level of human presence and possibly leads to increased human-wildlife conflicts. This is a valid concern that must be addressed through careful planning. However, failing to manage McIntyre Creek as a wildlife corridor would end the opportunity to proactively manage the landscapes and wildlife populations surrounding Whitehorse with a long-term conservation focus, and could inadvertently lead to higher levels of wildlife conflict as wildlife attempt to find a way through Whitehorse without the safety net of McIntyre Creek as a corridor. Kikoti et al. (2010) provide an example of a situation that led to the establishment of a conservation corridor that successfully reduced and proactively managed human-wildlife conflict.

Black bears appear to primarily use the McIntyre Creek area when food is scarce or when they are drawn in by attractants (EDI, 2011). Habituation of bears due to attractants can lead to human-bear conflicts, and ultimately bear mortality. People living in the neighborhoods adjacent to the McIntyre Creek corridor and recreational users of McIntyre Creek need to be well-versed in managing attractants and how to react during a bear encounter to avoid human-bear conflict and habituation of wildlife. Other wildlife such as coyotes and foxes can also come in conflict with humans by raiding garbage cans, preying on pets, and become habituated and reliant on people from being fed by humans. Road kill is another threat to wildlife populations, and collisions can be fatal to humans as well – especially collisions involving large species such as moose and mule deer. The major roads crossing McIntyre Creek, the Alaska Highway and Mountain View Drive, pose a potential barrier to species moving through the area from a safety standpoint and due to the level of disturbance from relatively high volumes of traffic. Future upgrades of these roadways should consider incorporating wildlife-friendly infrastructure such as underpasses which facilitate the safe passage of aquatic and terrestrial wildlife (EDI, 2011).

6.2.2 Utilizing a Wildlife Corridor: Landscape Connectivity for Conservation Planning

While various small to medium sized species reside in McIntyre Creek permanently, a camera trapping study completed in 2015 found Middle McIntyre functions as a movement corridor for large-ranging species (EDI, 2015). The level of human activity and narrowness of the area constrain Middle McIntyre's ability to support large-ranging species at all life stages. However, McIntyre Creek is the only corridor facilitating wildlife movement through the Whitehorse area. Corridors are important for movement, genetic connectivity and maintaining population resilience (Sawaya et al., 2014; Brodie et al., 2015). An important long-term conservation strategy is to develop a network of habitat patches connected by corridors (Brodie et al., 2015). While Upper McIntyre Creek serves as a largely intact habitat patch, Middle and Lower McIntyre Creek are important as a wildlife corridor; this role will likely become increasingly vital as the human population of Whitehorse continues to grow and development in the Whitehorse valley expands.

Development of a broad, regional-scale natural area network may be possible (Map 8). The Lewes Marsh Habitat Protection Area (south of Whitehorse) and Kusawa Park (west of Whitehorse) are located relatively closely to McIntyre Creek. In planning future land use, these areas could be connected to natural and ecologically important regions around Fish Lake and McIntyre Creek, which would then connect to the mountains east of Whitehorse. While this would already be a substantial network of different ecosystems that would support local biodiversity into the future, it could be expanded even further to connect to other natural and/or protected areas and important heritage sites in southern Yukon including Agay Mene Natural Environment Park and Kluane Wildlife Sanctuary (Map 8). Implementation of this network would require the partnership of Ta'an Kwächän Council, Kwanlin Dün First Nation, the City of Whitehorse, and the Yukon Government.

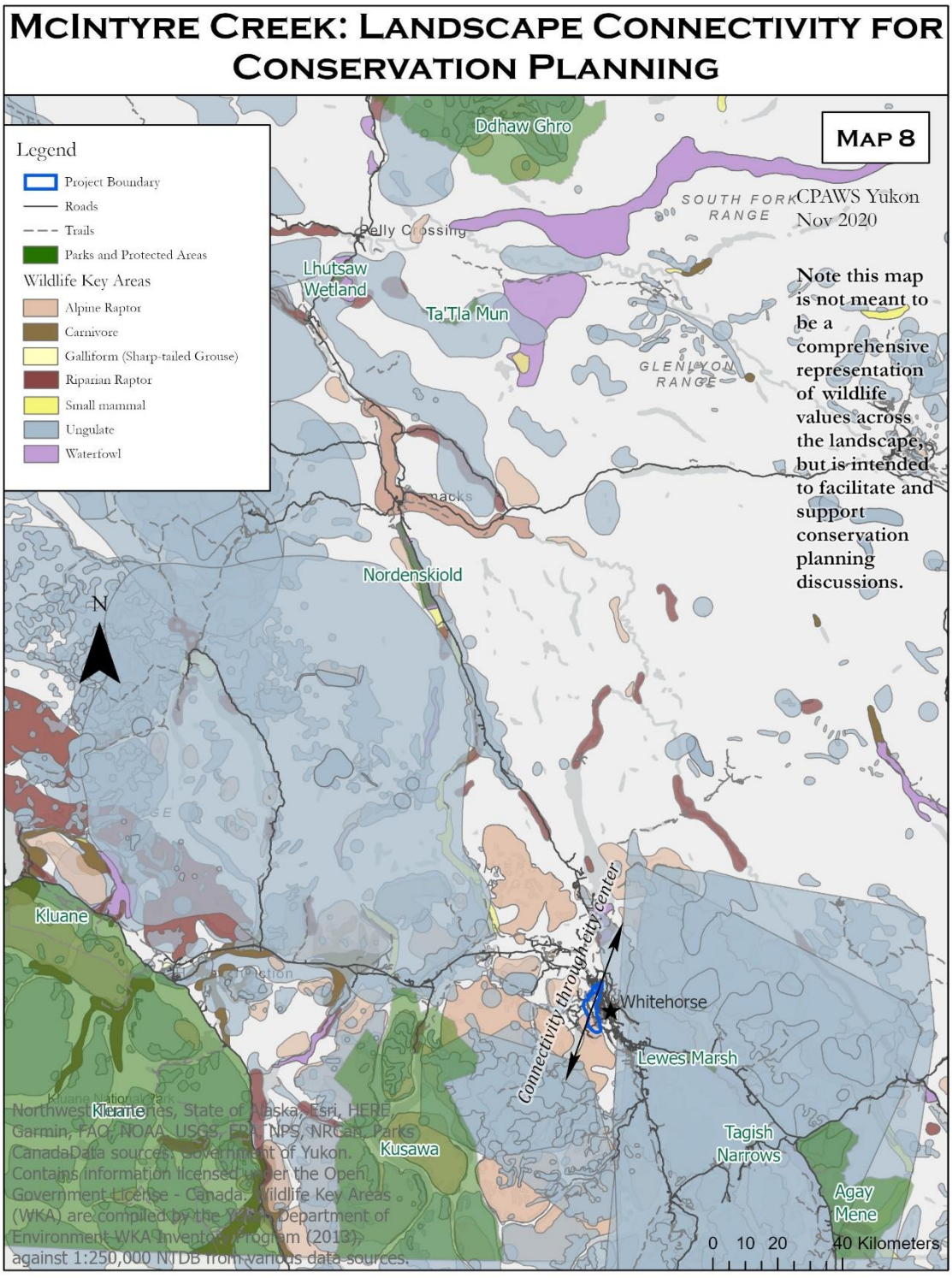
The needs of different species should be considered during this process. It is worth noting a multispecies approach to identifying habitat networks typically has more robust conservation results than planning for a single focal species (Liu et al., 2018). Consideration should also be given to ensuring a natural area network that expands longitudinally can be sustained over time, as wildlife and vegetation ranges are likely to shift with a changing climate. This type of network will ensure populations of a variety of species can remain

connected and reach the habitat they require – and limit the number of human-wildlife conflicts - even as development in the Whitehorse area increases. Loss of habitat connectivity can lead to an increase in negative interactions between people and wildlife, and McIntyre Creek currently provides a path for wildlife travelling through the most highly developed area in the Yukon.

The intent of making McIntyre Creek a protected area is not to exclude users – whether they be cultural, educational, commercial or recreational in nature – but to support healthy ecosystem functioning for the conservation of important wildlife habitat and the area's role as an active corridor. This core goal should be at the centre of all planning work to make sure it is being addressed while respecting the needs of different user groups, including the non-human ones: the wildlife.

FIGURE 22. A YELLOW-RUMPED WARBLER AT MCINTYRE CREEK. PHOTO BY STEVE WILSON.

MAP 8. MCINTYRE CREEK IN THE GREATER LANDSCAPE.



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APPENDIX A

Species Observed at McIntyre Creek

Table 1. Kingdom Plantae

Latin Name	Common Name
Abies lasiocarpa	Subalpine fir
Acer negundo	Boxelder
Achillea millefolium	Common yarrow
Actaea rubra	Red baneberry
Agropyron cristatum	Crested wheatgrass
Alnus alnobetula	Green Alder
Amelanchier alnifolia	Saskatoon serviceberry
Androsace septentrionalis	Pygmyflower rockjasmine
Anemonastrum richardsonii	Yellow thimbleweed
Anemone multifida	Pacific anemone
Anemone parviflora	Smallflowered anemone
Angelica archangelica	Wild celery
Antennaria rosea	Rosy pussytoes
Anticlea elegans	Mountain deathcamas
Aquilegia brevistyla	Smallflower columbine
Arabis pynocarpa	Hairy rockcress
Arctostaphylos rubra	Red fruit bearberry
Arctostaphylos uva-ursi	Kinnikinnick
Argentina anserina	Silverweed
Arnica angustifolia	Narrowleaf arnica
Arnica griscomii	Snow arnica
Arnica longifolia	Seep-spring arnica
Artemisia campestris	Field sagewort
Artemisia frigida	Prairie sagewort
Aster alpinus	Alpine aster
Astragalus alpinus	Alpine milkvetch
Astragalus australis	Indian milkvetch
Astragalus bodinii	Yukon milkvetch
Astragalus laxmannii	Laxmann’s milkvetch
Astragalus tenellus	Looseflower milkvetch
Betula glandulosa	American dwarf birch
Betula pendula	Silver birch
Bistorta vivipara	Alpine bistort
Blitum capitatum	Blite goosefoot
Boechera retrofracta	Second rockcress
Capsella bursa-pastoris	Shepherd’s purse
Caragana arborescens	Siberian Pea Tree
Cardamine bellidifolia	Alpine bittercress
Cardamine nymanii	Cuckoo-flower
Carex aquatilis	Water sedge
Carex aurea	Golden sedge
Carex capillaris	Hair-like sedge

Carex concinna	Beautiful sedge
Carex gynocrates	Northern bog sedge
Carex rossii	Ross's sedge
Chenopodium album	Common lamb's-quarters
Cherleria obtusiloba	Alpine Sandwort
Cirsium arvense	Creeping thistle
Corallorhiza trifida	Yellow coralroot
Cornus canadensis	Canadian bunchberry
Cornus sericea	Red osier dogwood
Crepis tectorum	Narrow-leaved Hawksbeard
Cypripedium passerinum	Sparrow's-egg lady's slipper
Dasiphora fruticosa	Shrubby cinquefoil
Delphium glaucum	Sierra larkspur
Diphasiastrum complanatum	Northern ground-cedar
Dryas drummondii	Yellow mountain-avens
Elymus lanceolatus	Streamside wild rye
Empetrum nigrum	Black crowberry
Epilobium angustifolium	Fireweed
Epilobium ciliatum	Fringed willowherb
Epilobium latifolium	Dwarf fireweed
Equisetum arvense	Field horsetail
Equisetum pratense	Shady horsetail
Equisetum scirpoides	Dwarf horsetail
Equisetum variegatum	Variegated horsetail
Erigeron acris	Bitter fleabane
Erigeron caespitosus	Caespitose fleabane
Erigeron compositus	Cut-leaf fleabane
Erysimum coarctatum	Crowded wormseed mustard
Erythranthe guttata	Seep monkeyflower
Eurybia sibirica	Siberian aster
Fallopia convolvulus	Black-bindweed
Festuca altaica	Rough fescue
Fragaria virginiana	Virginia Strawberry
Galearis rotundifolia	Small round-leaved orchid
Galeopsis bifida	Bifid hemp-nettle
Galium boreale	Northern bedstraw
Galium trifidum	Three-petal bedstraw
Gentiana prostrata	Pygmy gentian
Gentianella amarella	Autumn gentian
Gentianella propinqua	Fourpart dwarf gentian
Geocaulon lividum	Northern comandra
Geum macrophyllum	Large-leaved avens
Hedysarum alpinum	Alpine sweet-vetch
Hedysarum boreale	Boreal sweet-vetch
Heracleum sphondylium	Hogweed
Hippuris vulgaris	Common mare's tail

Hordeum jubatum	Squirreltail
Hylocomium splendens	Stairstep Moss
Juniperus communis	Common juniper
Juniperus horizontalis	Creeping juniper
Lappula occidentalis	Flatspine stickseed
Lappula squarrosa	Two-rowed Stickseed
Leucanthemum vulgare	Oxeye daisy
Linaria vulgaris	Common toadflax
Linnaea borealis	Twinflower
Linum lewisii	Lewis flax
Lupinus arcticus	Arctic lupin
Lycopodium lagopus	Arctic stag's-horn clubmoss
Maianthemum stellatum	Star-flowered lily-of-the-valley
Marchantia polymorpha	Common liverwort
Matricaria discoidea	Pineapple-weed
Melilotus albus	White sweetclover
Melilotus officinalis	Yellow sweetclover
Mertensia paniculate	Tall bluebell
Moneses uniflora	One-flowered wintergreen
Neottia borealis	Northern twayblade
Oxytropis campestris	Yellow oxytropis
Oxytropis deflexa	Pendant-pod point-vetch
Papaver croceum	Ice poppy
Parnassia palustris	Marsh grass-of-Parnassus
Pedicularis labradorica	Labrador lousewort
Pedicularis sudetica	Sudetic lousewort
Penstemon gormanii	Gorman's beardtongue
Persicaria amphibia	Water smartweed
Petasites frigidus	Arctic butterbur
Phacelia franklinii	Franklin's phacelia
Picea glauca	White spruce
Pinus contorta	Lodgepole pine
Plantago eriopoda	Saline plantain
Plantago major	Greater plantain
Platanthera aquilonis	North wind bog orchid
Platanthera obtusata	Blunt-leaved rein orchid
Platanthera orbiculata	Round-leaved bog orchid
Pleurozium schreberi	Red-stemmed feather moss
Polemonium acutiflorum	Tall Jacob's-ladder
Polemonium pulcherrimum	Pretty Jacob's-ladder
Populus balsamifera	Balsam popular
Populus tremuloides	Trembling aspen
Potentilla arenosa	Blug cinquefoil
Potentilla multifida	Divided cinquefoil
Potentilla norvegica	Rough cinquefoil
Potentilla pensylvanica	Prairie cinquefoil

Primula nutans	Sleepy primrose
Pulsatilla patens	Easter npasqueflower
Pyrola asarifolia	Bog wintergreen
Pyrola chlorantha	Green-flowered windergreen
Pyrola grandiflora	Arctic wintergreen
Ranunculus gmelinii	Small yellow water-crowfoot
Ranunculus nivalis	Snowy buttercup
Ranunculus trichophyllus	Thread-leaved water-crowfoot
Rheum rhabarbarum	Rhubarb
Rhinanthus minor	Yellow rattle
Rhododendron groenlandicum	Labrador tea
Rhododendron lapponicum	Lapland azalea
Ribes hudsonianum	Northern black currant
Ribes oxyacanthoides	Canadian gooseberry
Rorippa palustris	Bog yellowcress
Rosa acicularis	Prickly wild rose
Rubus arcticus	Arctic raspberry
Rubus idaeus	European raspberry
Rumex triangulivalvis	White willow dock
Salicornia rubra	Western glasswort
Salix alaxensis	Alaska willow
Salix planifolia	Tea-leafed willow
Salix scouleriana	Scouler's willow
Saxifraga tricuspidata	Prickly saxifrage
Sedum lanceolatum	Spearleaf stonecrop
Senecio lugens	Black-tip groundsel
Senecio triangularis	Arrowleaf senecio
Shepherdia canadensis	Canadian buffalo-berry
Solidago simplex	Sticky goldenrod
Sonchus arvensis	Perennial sow thistle
Stellaria longipes	Longstalk starwort
Syntrichia ruralis	Star moss
Tanacetum vulgare	Tansy
Taraxacum ceratophorum	Horned dandelion
Taraxacum officinale	Common dandelion
Tetraplodon mnioides	Slender cruet-moss
Tofieldia pusilla	Scottish asphodel
Trifolium hybridum	Alsike clover
Trifolium pratense	Red clover
Trifolium repens	White clover
Triglochin maritima	Common arrowgrass
Typha latifolia	Broadleaf cattail
Urtica dioica	Singing nettle
Vaccinium vitis-idaea	Lingonberry
Valeriana dioica	Marsh valerian
Veronica americana	American brooklime

Viburnum edule	Squashberry
Vicia cracca	Tufted vetch
Viola adunca	Hookedspur violet
Viola renifolia	Kidneyleaf white violet

Data Sources: GBIF.org, 2020a

Table 2. Kingdom Fungi

Latin Name	**Common Name**
Agaricus campestris	Meadow mushroom
Chrysomyxa arctostaphyli	Spruce witch's broom rust
Cladonia stellaris	Star-tipped reindeer lichen
Cortinarius impennoides	-
Hydellum peckii	Red-juice tooth
Lycoperdon perlatum	Common puffball
Pleurotus populinus	Aspen oyster mushroom
Tremella mesenterica	Witch's butter
Vulpicida pinastri	Powered sunshine lichen

Data Sources: GBIF.org, 2020a

Table 3. Arthopods: note some invertebrates were not identified to the species level, and those without a common name are denoted with "-".

Latin Name	**Common Name**
Aeshna eremita[x]	Lake darner
Aeshna interrupta[x]	Variable darner
Aeshna juncea[x]	Sedge darner
Aeshna sitchensis[x]	Zigzag darner
Aeshna subarctica[x]	Subarctic darner
Aglais milberti[x]	Milbert's tortoiseshell
Albuna pyramidalis[x]	Fireweed clearwing moth
*Alona/Biapertura sp.**	-
Ameletidae[L]*	Ameletid Mayflies
*Ameletus sp.**	Brown duns
Anatis mali[x]	Eye-spotted lady beetle
*Apatania sp.**	-
Aphididae[L]	Aphids
Apis mellifera[x]	Western honey bee
Arctica parthenos[x]	St. Lawrence tiger moth
Arphia conspersa[x]	Speckle-winged rangeland grasshopper
*Aturus sp.**	-
Baetidae*[L]	Baetid Mayflies
*Bezzia or Palpomyia sp.**	Biting midges
Bombus fernaldae[x]	Fernald's cuckoo bumble bee
Bombus flavifrons[x]	Yellow-fronted bumble bee
Bombus insularis[x]	Indiscriminate cuckoo bumble bee
Bombus melanopygus[x]	Black-tailed bumble bee

Bombus nevadensis[x]	Nevada bumble bee
Brachycentridae*[L]	Humpless casemaker caddisflies
Camponotus herculeanus[x]	Hercules ant
Candonidae*[L]	-
Capnia coloradensis[x]	Colorado snowfly
Capnia elongata[x]	Cascades snowfly
Capnia gracilaria[x]	Slender snowfly
Capniidae*[L]	Snowflies
Ceratopogonidae*[L]	Biting midges
Cerceris nigrescens[x]	-
Chelifera/Metachela sp. [x]	-
Chironomidae*[L]	Non-biting midges
Chloroperlidae*[L]	Green stoneflies
*Chydorus sphaericus**	Common ball waterflea
Cicindela longilabris[x]	Boreal long-lipped tiger beetle
Coccinella transversoguttata[x]	Transverse lady beetle
Coenagrion interrogatum[x]	Subarctic bluet
Colias canadensis[x]	Canadian sulphur
Cordulia shurtleffii[x]	American emerald
*Cyclocypris sp.**	-
Cyclorrhaphous/Brachycera*	-
Cyclopoida*	-
*Cypria sp.**	-
Cyprididae*[L]	-
*Cypridopsis sp.**	-
*Daphnia sp.**	Water fleas
Daphniidae[L]	Water flea family
*Dicranota sp.**	-
Dolichovespula maculata[x]	Bald-faced hornet
*Drunella doddsii**	Western green drakes
*Drunella spinifer**	Western slate olive dun
Dytiscidae[L]	Predaceous water beetles
Empididae*[L]	Dagger flies
Enallagma annexum[x]	Northern bluet
Enallagma boreale[x]	Boreal bluet
Enchytraidae*[L]	Potworms
Ephemerellidae*[L]	Spiny crawler mayflies
Erynnis persius[x]	Persius duskywing
*Eurycercus sp.**	-
*Feltria sp.**	-
Glaucopsyche lygdamus[x]	Silvery blue
*Glossoma sp.**	Saddle-case makers
Glossosomatidae*[L]	Saddle-case makers
Halictus rubicundus[x]	Orange-legged furrow bee
*Haliplus sp.**	-
Harpacticoida*	-

Hemaris thysbe[X]	Hummingbird clearwing
Heptageniidae*[L]	Stream mayflies
*Hesperoconopa sp.**	Crane flies
*Hesperoperla pacifica**	Golden stonefly
*Hesperophylax sp.**	-
Hydra*	-
Hydridae[L]	-
*Hydropsyche sp.**	-
Hydropsychidae[L]	Netspinning caddisflies
*Hydroptila sp.**	-
Hyroptilidae*[L]	Micro-caddisflies
Icaricia saepiolus[X]	Greenish blue
Lebertia sp.*	-
Lebertiidae[L]	-
Lepidostomatidae[L]	Bizarre caddisfly
Leptophlebiidae*[L]	Prong-gilled mayflies
Leucorrhinia borealis[X]	Boreal whiteface
Leucorrhinia hudsonica[X]	Hudsonian whiteface
Leucorrhinia proxima[X]	Belted whiteface
Leuctridae*[L]	Rolled-winged stoneflies
Libella quadrimaculata[X]	Four-spotted skimmer
Limenitis arthemis[X]	Red-spotted admiral
Limnephilidae*[L]	Northern caddisfly
*Limnophora sp.**	-
Lumbricidae*[L]	Earthworms
Lumbriculidae*[L]	Aquatic oligochaete worms
*Micrasema sp.**	-
Micrurapteryx salicifoliella[X]	Willow leaf blotch miner moth
Misumena vatia[X]	Goldenrod crab spider
Nemouridae*[L]	Spring snowflies
Nemotoda*	Roundworms
*Neoplasta sp.**	-
(Euphydryas) Occidryas anicia[X]	Anicia checkerspot
Oeneis jutta[X]	Jutta arctic
*Oxyethira sp.**	-
Papilio canadensis	Canadian tiger swallowtail
*Parapsyche sp.**	-
*Pericoma/Telmatoscopus sp.**	-
Perlidae*[L]	Common stoneflies
Perlodidae*[L]	Perlodid stoneflies
Phyllocnistis populiella[X]	Aspen serpentine leafminer moth
Podalonia luctuosa[X]	-
Polygonia faunus[X]	Green comma
Psychodidae*[L]	Moth flies
Rhinus antirhini[X]	Toadflax seed weevil
*Rhyacophila atrata Group.**	-

*Rhyacophila brunneae or vemna Group**	-
Rhyacophila hyalinata Group	Glassy free-living caddisfly
*Rhyacophila vofixa Group**	-
Rhyacophilidae*ᴸ	Rhyacophilid family
*Roederiodes sp.**	-
*Simocephalus vetulus**	-
Simuliidae*ᴸ	Blackflies
*Simulium sp.**	Blackflies
*Somatochlora franklini*ˣ	Delicate emerald
*Somatochlora septentrionalis*ˣ	Muskeg emerald
*Sperchon sp.**	-
Sperchontidaeᴸ	-
Staphylinidaeᴸ	Rove beetles
*Sympetrum danae*ˣ	Black meadowhawk
*Sympetrum internum*ˣ	Cherry-faced meadowhawk
*Taenionema sp.**	-
Taeniopterygidae*ᴸ	Willowflies
*Testudacarus sp.**	-
*Tipula sp.**	Crane flies
Tipulidae*ᴸ	Crane flies
Torrenticolidaeᴸ	Torrent mites
Tubificidae/Naididae*ᴸ	Clitellate oligochaete worms
Unionicolidaeᴸ	-
*Utacapnia columbiana*ˣ	Columbian snowfly
*Zapada cinctipes**ˣ	Common forestfly
*Zapada columbiana**	Tiny winter black
*Zapada haysi/oregonensis**	-

Data Sources: *Icy Waters Ltd., 2018-2019; ᴸCABIN, 2020; ˣGBIF.org, 2020a

Table 4. Molluscs

Latin Name	**Common Name**
*Deroceras laeve*ˣ	Meadow slug
*Galba sp.**	-
*Gyraulus parvus**	Ash gyro
*Ladislavella atkaensis*ˣ	Frigid pond snail
*Ladislavella elodes*ˣ	Marsh pond snail
Lymnaeidae*ᴸ	Pond snails
Physidae*ᴸ	Bladder snails
*Pisidium sp.**	Pea clams/ pill clams
Pisidiidaeᴸ	Pea clams
Planorbidae*ᴸ	Ramshorn snails
*Stagnicola sp.**	-
*Valvata sincera**	Mossy valvata
Valvatidae*ᴸ	Valve snails

Data Sources: *Icy Waters Ltd., 2018-2019; ᴸCABIN, 2020; ˣGBIF.org, 2020a

Table 5. Class Amphibia

Latin Name	Common Name
Lithobates sylvaticus	Wood frog

Data Sources: GBIF.org, 2020a

Table 6. Class Actinopterygii (ray-finned fishes)

Catostomus catostomus[ʁψ]	Longnose sucker
Cottus cognatus[ψ*ʁ˚]	Slimy sculpin
Lota lota[ψʁ]	Burbot
Oncorhynchus mykiss[ψʁ]	Rainbow trout
Oncorhynchus tshawytscha[ψʁʏ]	Chinook salmon
Prosopium cylindraceum[ψ]	Round whitefish
Salvelinus alpinus[ʁ]	Arctic char
Thymallus arcticus[ʁ]	Arctic grayling

Data Sources: [ψ]AEM, 2003; [ʏ]YRSREF, 2003; [ʁ]von Finster, 2011a; [˚]2011b; *Icy Waters Ltd., 2018-2019

Table 7. Class Aves

Latin Name	Common Name
Acanthis flammea[xϕ]	Common Redpoll
Acanthis hornemanni[ϕ]	Arctic Redpoll
Accipiter gentilis[ϕ]	Northern Goshawk
Accipiter striatus[xϕ]	Sharp-shinned Hawk
Actitis macularius[xϕ]	Spotted Sandpiper
Aegolius funereus[ϕ]	Boreal Owl
Agelaius phoeniceus[xϕ]	Red-winged Blackbird
Anas acuta[ϕ]	Northern Pintail
Anas americana[xϕ]	American Wigeon
Anas carolinensis[x]	Green-winged Teal
Anas clypeata[xϕ]	Northern Shoveler
Anas crecca[xϕ]	Eurasian Teal
Anas discors[xϕ]	Blue-winged Teal
Anas penelope[ϕ]	Eurasian Wigeon
Anas platyrhynchos[xϕ]	Mallard
Anas strepera[ϕ]	Gadwall
Anser albifrons[ϕ]	Greater White-fronted Goose
Anthus rubescens[xϕ]	Buff-bellied Pipit
Aquila chrysaetos[xϕ]	American golden eagle
Ardea herodias[ϕ]	Great Blue Heron
Asio flammeus[xϕ]	Short-eared Owl
Aythya affinis[ϕ]	Lesser Scaup
Aythya americana[ϕ]	Redhead
Aythya collaris[ϕ]	Ring-necked Duck
Aythya marila[ϕ]	Greater Scaup
Bartramia longicauda[ϕ]	Upland Sandpiper

Bombycilla cedrorum[ϕ]	Cedar Waxwing
Bombycilla garrulus[xϕ]	Bohemian Waxwing
Bonasa umbellus[ϕ]	Ruffed Grouse
Branta canadensis[ϕ]	Canada Goose
Branta hutchinsii[ϕ]	Cackling Goose
Bubo virginianus[ϕ]	Great Horned Owl
Bucephala albeola[xϕ]	Bufflehead
Bucephala clangula[xϕ]	Common Goldeneye
Bucephala islandica[xϕ]	Barrow's Goldeneye
Buteo jamaicensis[xϕ]	Red-tailed Hawk
Buteo lagopus[ϕ]	Rough-legged Hawk
Calcarius lapponicus[xϕ]	Lapland Longspur
Calidris alpina[ϕ]	Dunlin
Calidris bairdii[ϕ]	Baird's Sandpiper
Calidris melanotos[ϕ]	Pectoral Sandpiper
Calidris minutilla[ϕ]	Least Sandpiper
Calidris pusilla[ϕ]	Semipalmated Sandpiper
Cardellina pusilla[xϕ]	Wilson's Warbler
Catharus guttatus[ϕ]	Hermit Thrush
Catharus minimus[ϕ]	Gray-checked Thrush
Catharus ustulatus[ϕ]	Swainson's Thrush
Certhia americana[ϕ]	Brown Creeper
Charadrius semipalmatus[xϕ]	Semipalmated Plover
Charadrius vociferus[ϕ]	Killdeer
Chen caerulescens[ϕ]	Snow Goose
Chordeiles minor[ϕ]	Common Nighthawk
Chroicocephalus philadelphia[xϕ]	Bonaparte's Gull
Cinclus mexicanus[xϕ]	American Dipper
Circus hudsonius[xϕ]	Northern Harrier
Clangula hyemalis[ϕ]	Long-tailed Duck
Colaptes auratus[xϕ]	Northern Flicker
Contopus cooperi[xϕ]	Olive-sided Flycatcher
Contopus sordidulus[xϕ]	Western Wood Pewee
Corvus brachyrhynchos[ϕ]	American Crow
Corvus corax[xϕ]	Common Raven
Cygnus buccinator[xϕ]	Trumpeter Swan
Cygnus columbianus[ϕ]	Tundra Swan
Dendrocopos pubescens[ϕ]	Downy Woodpecker
Empidonax alnorum[xϕ]	Alder Flycatcher
Empidonax flaviventris[ϕ]	Yellow-bellied Flycatcher
Empidonax hammondii[xϕ]	Hammond's Flycatcher
Empidonax minimus[ϕ]	Least Flycatcher
Empidonax oberholseri[ϕ]	Dusky Flycatcher
Eremophila alpestris[ϕ]	Horned lark
Euphagus carolinus[xϕ]	Rusty Blackbird
Falcipennis canadensis[ϕ]	Spruce Grouse

Falco columbarius[xΦ]	Merlin
Falco sparverius[Φ]	American Kestrel
Fulica americana[Φ]	American Coot
Gallinago delicata[xΦ]	Wilson's Snipe
Gavia adamsii[x]	Yellow-billed Loon
Gavia immer[xΦ]	Common Loon
Geothlpis tolmiei[Φ]	MacGillivray's Warbler
Geothlypis trichas[xΦ]	Common Yellowthroat
Haemorhous purpureus[Φ]	Purple Finch
Haliaeetus leucocephalus[xΦ]	Bald Eagle
Hirundo rustica[xΦ]	Barn Swallow
Histrionicus histrionicus[Φ]	Harlequin Duck
Lxoreus naevius[xΦ]	Varied Thrush
Junco hyemalis[xΦ]	Dark-eyed Junco
Lanius borealis[Φ]	Northern Shrike
Larus argentatus[xΦ]	Herring Gull
Larus canus[xΦ]	Mew Gull
Larus delawarensis[x]	Ring-billed Gull
Larus glaucescens[Φ]	Glaucous-winged Gull
Larus glaucoides[x]	Iceland Gull
Larus hyperboreus[Φ]	Glaucous Gull
Leiothlypis celata[xΦ]	Orange-crowned Warbler
Leiothlypis peregrina[Φ]	Tennessee Warbler
Leiothlypis ruficapilla[Φ]	Nashville Warbler
Leucosticte tephrocotis[Φ]	Gray-crowned Rosy Finch
Limnodromus griseus[Φ]	Short-billed Dowitcher
Limnodromus scolopaceus[Φ]	Long-billed Dowitcher
Lophodytes cucullatus[xΦ]	Hooded Merganser
Loxia curvirostra[Φ]	Red Crossbill
Loxia leucoptera[Φ]	White-winged Crossbill
Megaceryle alcyon[xΦ]	Belted Kingfisher
Melanitta fusca[Φ]	Velvet Scoter
Melanitta perspicillata[xΦ]	Surf Scoter
Melospiza lincolnii[xΦ]	Lincoln's Sparrow
Melospiza melodia[Φ]	Song Sparrow
Mergus merganser[Φ]	Common Merganser
Mergus serrator[Φ]	Red-breasted Merganser
Molothrus ater[Φ]	Brown-headed Cowbird
Myadestes townsendi[xΦ]	Townsend's Solitaire
Oxyura jamaicensis[Φ]	Ruddy Duck
Pandion haliaetus[xΦ]	Osprey
Parkesia noveboracensis[xΦ]	Northern Waterthrush
Passerculus sandwichensis[xΦ]	Savannah Sparrow
Passerella iliaca[xΦ]	Fox Sparrow
Perisoreus canadensis[xΦ]	Canada Jay
Petrochelidon pyrrhonota[Φ]	Cliff Swallow

Phalaropus lobatus[ϕ]	Red-necked Phalarope
Pica hudsonia[ϕ]	Black-billed Magpie
Picoides dorsalis[ϕ]	American Three-toed Woodpecker
Picoides villosus[ϕ]	Hairy Woodpecker
Pinicola enucleator[ϕ]	Pine Grosbeak
Piranga ludiviciana[ϕ]	Western Tanager
Plectrophenax nivalis[ϕ]	Snow Bunting
Pluvialis dominica[ϕ]	American Golden-plover
Pluvialis squatarola[ϕ]	Black-bellied Plover
Podiceps auritus[xϕ]	Horned Grebe
Podiceps grisegena[xϕ]	Red-necked Grebe
Poecile atricapillus[xϕ]	Black-capped Chickadee
Poecile gambeli[ϕ]	Mountain Chickadee
Poecile hudsonicus[xϕ]	Boreal Chickadee
Porzana Carolina[xϕ]	Sora
Regulus calendula[xϕ]	Ruby-crowned Kinglet
Regulus satrapa[ϕ]	Golden-crowned Kinglet
Riparia riparia[xϕ]	Sand martin
Sayornis saya[ϕ]	Say's Phoebe
Setophaga coronata[xϕ]	Yellow-rumped Warbler
Setophaga petechia[xϕ]	Mangrove Warbler
Setophaga ruticilla[ϕ]	American Redstart
Setophaga striata[xϕ]	Blackpoll Warbler
Setophaga townsedi[ϕ]	Townsend's Warbler
Sialia currocoides[ϕ]	Mountain Bluebird
Sitta canadensis[ϕ]	Red-breasted Nuthatch
Sphyrapicus varius[ϕ]	Yellow-bellied Sapsucker
Spinus pinus[ϕ]	Pine Siskin
Spizella breweri[ϕ]	Brewer's Sparrow
Spizella passerina[xϕ]	Chipping Sparrow
Spizelloides arborea[ϕ]	American Tree Sparrow
Stelgidopteryx serripennis[xϕ]	Northern Rough-winged Swallow
Sterna paradisaea[xϕ]	Arctic Tern
Sternus vulgaris[ϕ]	Common Starling
Tachycineta bicolor[xϕ]	Tree Swallow
Tachycineta thalassina[xϕ]	Violet-green Swallow
Tringa flavipes[xϕ]	Lesser Yellowlegs
Tringa melanoleuca[ϕ]	Greater Yellowlegs
Tringa solitaria[xϕ]	Solitary Sandpiper
Turdus migratorius[xϕ]	American Robin
Vireo gilvus[ϕ]	Warbling Vireo
Zonotrichia atricapilla[ϕ]	Golden-crowned Sparrow
Zonotrichia leucophrys[xϕ]	White-crowned Sparrow

Data Sources: [x]GBIF.org, 2020a; [ϕ]2020b

Table 8. Class Mammalia

Latin Name	Common Name
*Alces alces*ʰ†	Moose
*Canis latrans*ᵊˣ	Coyote
*Canis lupus*ˣ	Wolf
*Castor canadensis*ˣ	American beaver
*Erethizon dorsatus*ˣ	North American porcupine
*Lynx canadensis*ˣ	Canada lynx
*Martes americanus*ᵊ	American marten
Odocoileus hemionus†	Mule deer
*Ondatra zibethicus*ˣ	Muskrat
Rangifer tarandus†	Caribou
*Tamias minimus*ˣ	Least chipmunk
*Tamias hudsonicus*ᵊˣ	Red squirrel
*Urocitellus parryii*ˣ	Arctic ground squirrel
*Ursus americanus*ʰ	American black bear
*Ursus arctos*ʰ	Grizzly bear
*Vulpes vulpes*ˣ	Red fox

Data Sources: ᵊEDI, 2011; ʰTakhini North Community, 2016-2020; ˣGBIF.org, 2020a; †Government of Yukon, 2020

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